DRAFT

4.0 ENVIRONMENTAL EFFECTS

This section is the scientific and analytic basis for the comparisons of the alternatives, and examines the anticipated direct, indirect, and cumulative environmental effects associated with the various alternatives that were studied in detail in this EIS. The alternatives, the Proposed Action, No USACE Jurisdictional Wetlands Impact, and No Action, are described in Chapter 2. Table 2.5-1 in Chapter 2.0 provides a comparison of impacts for each of these alternatives.

For ease of comparison, the impact analyses discussed in this Chapter are grouped by the same environmental and socioeconomic resources as presented in Chapter 3, Affected Environment. The anticipated environmental effects of the alternatives are analyzed for each resource. Some effects are expressed in quantitative terms and others in qualitative terms. For the Proposed Action Alternative, every mining process activity (e.g., mining, matrix transport) and its different option(s) (e.g., slurry transport, conveyor transport) are discussed for each resource discipline (e.g., vegetation, surface water hydrology).

4.1 GENERAL ENVIRONMENTAL EFFECTS

Minimal permanent impacts are expected to occur to the general environment from the proposed project. Impacts to vegetation would be temporary and reclamation of land cover after mining would generally result in the same land use and land cover as the pre-mining condition. A major change would be the addition of several large lakes on the eastern side of the property to accommodate requests by local governments. Additionally, some locations of on-site soils would consist entirely of clay soils.

Site topography in these areas would also be altered. The slopes used in reclamation would conform to the current FDEP standard that no slope be steeper than 4H:1V. The only areas that would have slopes that approach this steepness are those around the reclaimed clay settling area dams. However, even though the elevation of a portion the site would be higher after mining, in general, the site would be returned to the same relatively flat topography as currently exists.

Minor impacts on surface water flow would result from some areas of land periodically being removed from the natural drainage systems during mining. Runoff to some streams would be reduced since active mining areas would be isolated from the natural drainage basins and would not contribute runoff to their flow until reclamation is complete. Rain falling within the mining and disposal areas would be captured by the mine recirculation system for use in the mining operations. However, the groundwater inflow/outflow and stream baseflows that are near excavated open mine cuts would be maintained by BMP ditch and berm or recharge well systems along all undisturbed areas, such as unmined floodplains, wetlands, and property boundaries. In addition, NPDES discharges back into Horse Creek and Brushy Creek would offset much of the reduction from the capture of

DRAFT

surface water during higher flow periods. Streamflow after reclamation is expected to be approximately one cfs less than prior to mining primarily because of the increased evaporation caused from the addition of lakes to the site. The lakes are part of the reclamation plan and were requested by Hardee County. Impacts on the Horse Creek and Peace River water budget are expected to be minimal

The use of groundwater would have localized effects on the FAS, and would have minimal impacts to the region. Withdrawals would be within the limits established by IMC's existing WUP, which is closely regulated by the SWFWMD.

IMC's WUP requires extensive monitoring to assure that permit conditions are being met. Compliance with these conditions would be demonstrated through the preparation of monitoring reports submitted to regulatory agencies throughout the period of mining and reclamation.

Land clearing activities in preparation for mining would disperse wildlife to adjacent habitats. Mobile wildlife species, including threatened and endangered wildlife, would relocate to undisturbed areas of the property during land clearing, while less-mobile listed species such as gopher tortoises and their commensals would be captured and relocated. No federally-listed plant species would be affected. However, state-listed species of plants may be lost during land clearing. Efforts to avoid impacts to threatened and endangered species of plants and animals would include pre-clearing surveys, collection, and subsequent relocation to undisturbed or reclaimed habitats on-site or off-site.

Socioeconomic impacts are generally positive with an increase in property tax revenue to Hardee and Polk Counties during the life of the mine. Existing trip generation levels would continue on SR 37, SR 62, and old SR 37 for the commensurate time-period with traffic eventually increasing on SR 64 and CR 663 (the Fort Green-Ona Road) as employment shifts from Fort Green Mine to the Ona Mine.

4.2 VEGETATION

Vegetative communities at the Ona site would be affected by activities associated with mining, including clearing to facilitate excavation of overburden and phosphate matrix, and construction of access corridors for roads, power lines, dragline walkpaths, pipelines, the plant site, and associated rail spurs. Clay settling areas are constructed on land that has already been cleared and mined, and therefore would not affect existing vegetative communities.

4.2.1 Proposed Action Alternative

4.2.1.1 Mining Methods

4.2.1.1.1 Dragline Mining (IMC's Proposed Action)

Site clearing in preparation for dragline mining operations would result in the direct loss of vegetative communities. This loss of vegetation is not considered permanent, as the total acreage of each vegetative community type in most cases would be restored during post-mining reclamation. Details of the proposed reclamation plan are found in Section 4.2.1.7.

A summary of the vegetative communities present on the 20,676-acre Ona site, and the acreage of each community that would be disturbed, preserved, and/or reclaimed is found in Table 4.2-1. Figure 3.2-1 details the location of each vegetative community at the Ona site. Approximately 77 percent (15,836.1 acres) of the mine property would be disturbed over the lifetime of the mine, with the remaining 23 percent (4,839.5 acres) to remain undisturbed as areas of conservation interest. Land clearing would proceed at an average rate of about 720 acres (one square mile) per year, for approximately 22 years. Because land reclamation activities are completed on specific parcels with the tract beginning in year 5 and would continue through the life of the mine at an average rate of 610 acres per year for the 26 ensuing years, the maximum amount of land that would be cleared of vegetation at any one time is about 11,000 acres.

The locations of access corridors (see Figure 2.2-1) are designed to minimize the disturbance of sensitive habitats such as streams and to avoid impacts to listed species of plants and animals and their critical habitat. Access corridors are located to meet the mine transportation needs for the ore, clay and sand tailings; power lines; water recirculation system; and mobile mine equipment, including the dragline walkpaths. The corridors are 400 or 600 feet in width, depending on the number of pipelines and other infrastructure needed to support the mining operations. Lands occupied by access corridors would be reclaimed to premining conditions upon the completion of mining, primarily as woodland pastures, hardwood-conifer mixed forest, live oak, and temperate hardwoods. Some access roads would be left in place for post-mining land management activities, including the crossing of Brushy Creek.

As a result of meetings with agencies as part of the ecosystem management process, and extensive field studies, IMC proposes to leave a substantial portion of the Ona site undisturbed, including both wetland and upland systems determined to be of significant ecological value. As part of the Ona project, IMC would grant four conservation easements at the Ona site and one conservation easement on the adjoining Fort Green Southern Reserves site (Figure 4.2-1). These conservation easements would cover about 20 percent of the property, and would be granted to the State of Florida and managed in perpetuity to ensure that large areas of natural habitat are not developed.

DRAFT

For safety and for optimum ore (matrix) recovery, draglines require essentially dry conditions in the mining pit. High water table conditions can cause wall failures, while excessive water in the mine cut makes it difficult for the dragline operator to detect the matrix horizons within the soil. Therefore, the active mining cuts must be dewatered in order to safely and efficiently remove the matrix. This dewatering could affect the water table in and beneath wetlands and streams adjacent to the active mine, and therefore, result in secondary effects on adjacent vegetation. A reduction in wetland hydroperiod can allow the encroachment of upland vegetation and loss of wetland functions such as water treatment, storage, and recharge, as well as wildlife habitat. The reduction in wetland hydroperiod would be mitigated through the use of a berm and swale system designed to maintain the water table in wetlands adjacent to dewatered mine cuts.

No surface water withdrawal from on-site streams is proposed. Alternately, a combination of surface water capture (collecting rainfall from active mining and disturbed, but unreclaimed areas) and supplemental groundwater withdrawals is proposed to fulfill the water use needs of the Ona mine. Surface water capture would be utilized at each mine cut for the time between initiation of mining and reclamation. Surface water capture would not be conducted on unmined or reclaimed areas. The SWFWMD has determined that no adverse impacts would occur because of groundwater withdrawal within permitted limits, including no impacts to the water table beneath wetlands (IMC, 2002). See Section 4.7 for additional information about the SWFWMD WUP.

The capture of rainfall runoff from active mining areas and disturbed, but unreclaimed, lands for use in the mine recirculation system or discharge through a permitted outfall would preclude the runoff from reaching adjacent wetlands. This could result in additional secondary impacts to wetland vegetation through decreased hydroperiod during the period of surface water capture. In order to minimize impacts to wetland vegetation adjacent to active mining areas, IMC would construct perimeter berm and swale systems (recharge ditches) designed to maintain the water table and mitigate the effects of a decreased hydroperiod on wetland vegetation. In addition, the berm and swale system would capture sediment-laden stormwater. If the recharge ditches function as designed, they should preclude any effects on vegetation from reduced hydroperiod. Should this system fail to function as designed, the conditions of IMC's WUP would require alternate artificial hydration techniques be designed and used. Section 4.7 presents details about the construction and function of the perimeter berm and swale recharge systems.

Impacts resulting from the Proposed Action Alternative are described below for each vegetative community type.

A. Upland Communities

Upland vegetative associations at the Ona site include those categorized within the FLUCFCS as series 200, agricultural uses (pasture, crops, and citrus groves), series 300, rangeland (herbaceous, palmetto prairies, other shrub and brushland, and mixed rangeland), and series 400, upland forests (pine flatwoods, sand pine, pine-mesic oaks, temperate hardwoods, live oak, sand live oak, hardwood-conifer mixed, and mixed hardwoods). Overall, there currently are 16,470.3 acres classified as agricultural, rangeland, and upland forest at the Ona site. IMC proposes to mine 13,126.9 acres of upland communities and leave 3,343.4 acres undisturbed (Table 4.2-1). Over half of the acreage to be disturbed (7,821.9 acres) is agricultural land, primarily improved pasture. The reclamation plans include 11,541.5 acres of upland communities, which would result in a total of 14,884.8 acres of uplands once the Ona site reclamation is completed. This corresponds to an approximate 10 percent loss in acreage of upland communities between the pre- and post-mining landscape. The reduction in upland acreage is predominantly due to the reduction in acreage of reclaimed improved pasture. The post-reclamation acreage of upland forest (5,170.6 acres) and rangeland (2,999.1 acres) is greater than or similar to the pre-mining acreage (Table 4.2-1). Details of reclamation plans for each vegetative community type are found in Section 4.2.1.7.

Descriptions of each upland vegetative community and their species composition are found in Section 3, Affected Environment.

Agricultural Uses

Agricultural uses (FLUCFCS 200) currently comprise 8,417.9 acres of the Ona site, approximately 41 percent of the entire property. IMC proposes to mine 7,821.9 acres of agricultural lands, not disturb 596 acres, and reclaim 6,119.1 acres. The total post-mining area of agricultural lands is projected to be 6,715.1 acres, which corresponds to a loss of approximately 20 percent of the pre-mining acreage.

The proposed action would result in the direct loss of vegetative communities associated with pastures, agricultural field crops, and citrus groves. These communities were converted from native habitat for agricultural use and currently contain few unique species; therefore, the ecological impacts of clearing and not reclaiming these areas to an equivalent acreage are minimal. Economic considerations of the conversion of agricultural lands are discussed in Section 4.12.

Rangeland

Rangeland (FLUCFCS 300) comprises 3,053.7 acres of the Ona site, approximately 15 percent of the entire property. IMC proposes to mine 2,531.2 acres of rangeland, not disturb 522.5 acres, and reclaim 2,476.6 acres as palmetto prairies, as well as shrub and brushland. The total post-mining area of rangeland is projected to be 2,999.1 acres, which corresponds to a loss of approximately two percent of the pre-mining acreage. Acreage of impact and reclamation for each type of rangeland is presented in Table 4.2.1.

Preparation for dragline mining would result in clearing the majority of rangeland habitats at the Ona site. Several types of rangeland (herbaceous, mixed, other shrub and brushland) would not be reclaimed type-for-type, however these categories of rangeland comprise only 125.7 acres, and would be mitigated through the creation of shrub and brushland. Shrub and brushland (FLUCFCS 320) differ from herbaceous (FLUCFCS 310) and mixed (FLUCFCS 329) rangeland due to the increased dominance of shrubs. Prairie grasses dominate herbaceous rangeland, and mixed rangeland contains an intermixture of grassland and brushland. Reclamation plans include 673.1 acres of shrub and brushland, and 1,803.5 acres of palmetto prairies; therefore, the loss of rangeland habitat would be temporary.

Upland Forests

Upland forests (FLUCFCS 400) comprise 4,998.7 acres of the Ona site, approximately 24 percent of the entire property. IMC proposes to mine 2,773.8 acres (55 percent) of upland forests, not disturb 2,224.8 acres (45 percent), and reclaim 2,945.8 acres. The total post-reclamation area of upland forest is projected to be 5,170.6 acres, which corresponds to an increase of approximately three percent compared to the pre-mining acreage. Impacts to each type of upland forest community are discussed below. For each upland community type, the acreage to be left undisturbed, acreage to be cleared, and acreage to be reclaimed is presented in Table 4.2-1. Details of reclamation plans for upland forest habitats are found in Section 4.2.1.7.

Clearing upland forests in preparation for mining would remove native vegetation, render existing habitat unavailable, and displace wildlife. In most instances, significant acreage of upland forest would remain undisturbed, and the majority of impacted habitats would be recreated during reclamation. In the case of sand pine, all 23.7 acres would be cleared prior to mining, and 114.5 acres would be created during reclamation. Other communities including pine flatwoods, temperate hardwoods, live oak, sand live oak, hardwood-conifer mixed, and mixed hardwoods, would be reduced in acreage by 6 to 38 percent following reclamation. The reduction in acreage of pine flatwoods would be offset by the additional creation of 1,243 acres of upland coniferous forest (FLUCFCS 410), which differ from pine flatwoods due to the presence and dominance of certain understory species. When reclaimed upland coniferous forest areas are combined with the post-reclamation acreage of pine flatwoods (1,029.5 acres) and sand pine (114.5 acres), the total acreage (2,387 acres) significantly exceeds the pre-mining acreage of pine-dominated forests (1,503.3 acres). Pine-mesic oaks, which comprise only 5.7 acres of the Ona site, would be reduced by 77 percent and not be reclaimed. However, due to the creation of additional upland forest habitat described above, the overall acreage of upland forest upon completion of reclamation is proposed to be three percent greater than the pre-mining acreage. The 45 percent of upland forests that are to remain undisturbed are located in corridors identified as important for wildlife that would be preserved in perpetuity through conservation easements (Figure 4.2-1).

B. Open Water

Open water (FLUCFCS 500) comprises 115.7 acres of the Ona site, approximately 0.6 percent of the entire property, in the form of natural streams, man-made ditches, and cattle ponds (reservoirs <10 acres). IMC plans to mine 85.1 acres of these habitats, not disturb 30.6 acres, and reclaim 1,034.5 acres, primarily as lakes. The total post-reclamation area of open water is projected to be 1,065.1 acres. This is proposed to fulfill the Hardee County Commission's request to maximize the acreage of lakes. Acreage of impact and reclamation for each type of aquatic habitat is presented in Table 4.2-2.

Primary impacts to streams include construction of dragline crossings of Brushy Creek, and mining of the headwaters of Hickory Creek and the floodplain channel of Oak Creek, which has been altered through ditching, clearing of the floodplain, and agricultural activities. Stream crossings of Brushy Creek would directly impact floodplain vegetation surrounding stream channels and remove potential habitat for fish and wildlife resources including listed plant and animal species. The loss of man-made ditches and cattle ponds is not considered ecologically significant to the overall vegetative landscape. Nonetheless, most of the cattle ponds would be replaced during reclamation.

Secondary impacts to streams may occur from the capture of surface water runoff by the mine water system, thereby reducing rainfall runoff to undisturbed areas of streams. To avoid secondary impacts from a reduced hydroperiod and degraded water quality, an augmentation recharge ditch and berm system would be constructed adjacent to stream floodplains. The ditch and berm system is designed to maintain the water table elevation adjacent to undisturbed streams and wetlands; therefore the capture of surface water should not adversely impact stream base flow.

Wetland Communities

Wetland vegetative associations at the Ona site include those forested and non-forested communities categorized within the FLUCFCS as series 600, wetlands (bay swamps, gum swamps, stream swamps, inland ponds and sloughs, mixed wetland hardwoods, wetland coniferous, wetland mixed hardwood-coniferous, freshwater marshes, wet prairies, emergent aquatics, and shrub swamps). Additional USACE jurisdictional wetland areas were defined within vegetative communities typically associated with uplands, including single family homes, spoil areas, improved and unimproved pastures, herbaceous rangeland, palmetto prairies, other shrub and brush, mixed rangeland, woodland pastures, pine flatwoods, pine-mesic oaks, temperate hardwoods, live oak, hardwood-conifer mixed, and mixed hardwoods. Overall, there currently are 4,901.0 acres classified as USACE jurisdictional wetlands at the Ona site. IMC proposes to mine 2,764.7 acres (56.4 percent) of the USACE jurisdictional wetland communities, not disturb 2,136.4 acres (43.5 percent), and reclaim 3,918.3 acres. Upon completion of reclamation, the Ona site would contain 6,054.6 acres of wetlands, an increase of 23.5 percent compared to the pre-mining acreage. Acreage of impact and reclamation for each type of wetland community is presented in Table 4.2-2.

The temporary loss/gain of wetlands over time (Figure 4.2-2) indicates that the acreage of undisturbed existing wetlands decreases steadily during the first 20 years of mining. However, the overall available wetland habitat remains greater than the pre-mining acreage throughout the lifetime of the mine, due to the creation of clay settling areas and reclaimed wetlands. The acreage of wetlands reclaimed between mine years 16 and 22 (1,413 acres), is almost twice the acreage of newly disturbed wetlands (788.2 acres). No existing wetlands would be disturbed between mine years 23 and 30, and by mine year 25 the total acreage of reclaimed wetlands (2,920 acres) exceeds the total acreage of disturbed existing wetlands (2,765 acres). Along with reclaimed wetlands, additional open water habitat would be available in active clay settling areas, the first of which would be created in mine year two.

Figure 4.2-3 shows the location and type of USACE jurisdictional wetlands currently present at the Ona site. A functional assessment of each wetland was conducted using the USACE-approved IMC WRAP, a modified version of the SFWMD WRAP that customizes the procedure for the landforms, vegetative cover, hydrology, and water quality issues encountered at phosphate mining and reclamation sites in central Florida. Through consultation with USACE and FDEP, the SFWMD WRAP variable "Water Quality Input and Treatment Systems" was customized to more accurately address the landscape of central Florida phosphate mining. Specifically, the water quality variable scoring procedure was modified to reflect land use related pollutant loading rates for the specific FLUCFCS classifications that exist prior to mining and following reclamation instead of the more general land use categories applied in the SFWMD WRAP. In addition a "modifier" has been added to reflect the influence of differing levels of human influence on the stormwater pollutant loading rates from different parcels with the same FLUCFCS level III classification. The water quality treatment factor is equally weighted with water quality input in the SFWMD WRAP. A much smaller range of land uses are found on phosphate reserve property and reclaimed mine lands when compared to the variety of land uses that the SFWMD WRAP must address. Stormwater treatment systems are rarely found on phosphate reserve property, therefore the IMC-WRAP water quality input variable focused upon the land uses found on unmined reserve and reclaimed lands, while excluding treatment as an equally weighted variable.

Figure 4.2-4 shows the WRAP score for each wetland. A summary of the WRAP data with the number of acres of jurisdictional wetlands by FLUCFCS code and WRAP score in 0.10 units is found in Table 4.2-4. Table 4.2-5 illustrates the number of acres of wetlands by FLUCFCS code and WRAP score for the areas proposed for mining or disturbance. Comparison of Tables 4.2-4 and 4.2-5 demonstrate that a higher percentage of those wetlands with the highest WRAP scores are to be avoided. The IMC WRAP methodology developed under the direction of the USACE and used to determine compensatory mitigation requirements is included in Appendix D.

Wetland areas designated for mining would be drained and cleared, while those wetland areas in the path of the proposed utility/access corridors would be cleared and filled. The proposed action of dragline mining would result in the direct loss of those wetland vegetative communities proposed for mining. Wetlands adjacent to active mining areas could experience secondary impacts including temporary lowering of water levels, increased sedimentation, lowered groundwater tables, increased surface runoff, erosion, and long-term hydroperiod alterations. To avoid these secondary impacts from active mining and reclamation operations, IMC is proposing to utilize a series of techniques including recharge ditch systems to maintain wetland hydroperiods, silt fences, and vegetated secondary containment perimeter berms.

Descriptions of each wetland vegetative community and their species composition are found in Section 3.2. Impacts to each wetland community type resulting from the Proposed Action Alternative (dragline mining) are discussed below.

Forested Wetlands

USACE jurisdictional forested wetlands (FLUCFCS 610-630 and additional parcels of FLUCFCS 213, 511 and the 400 series) comprise 2,537.3 acres of the Ona site, approximately 12.3 percent of the entire property. IMC proposes to disturb 1,124.8 acres (44 percent) of the forested wetlands during mine, not disturb 1,412.5 acres (56 percent), and reclaim 1,252.7 acres. Upon completion of reclamation, the total area of forested wetlands (2,665.2 acres) represents an increase of five percent compared to the pre-mining acreage.

The proposed action would result in the loss of approximately 125.1 acres (67 percent) of the existing bay, gum, and stream swamps at the Ona site. Reclamation plans include 183.9 acres of swamps, which would result in a total of 245.4 acres upon completion, an increase of approximately 32 percent compared to pre-mining acreage. The temporary loss of swamp habitat could potentially impact undisturbed swamps and downstream habitats through increased surface runoff, decreased water quality and quantity, and loss of water storage and treatment capabilities. Several methods would be used to prevent these impacts to undisturbed swamp communities and downstream habitats including silt

DRAFT

fences, vegetated perimeter berms, and recharge perimeter ditch systems, which have been designed to maintain the water table level adjacent to active mining areas. Although these techniques may prevent impacts to those areas that would not be disturbed, the proposed action of dragline mining would at least temporarily reduce the amount of forested wetland habitat. Reclamation techniques proposed by IMC are discussed in Section 4.2.1.7.

Mixed wetland hardwoods, wetland coniferous, and wetland hardwood-coniferous forests comprise 1,201.3 acres of the Ona site. Dragline mining would result in the loss of 565.9 acres of these communities, which is approximately 47 percent of the total acreage. Reclamation plans include 1,068.2 acres of hardwood and coniferous wetlands, which would result in a total of 1,703.5 acres upon completion of reclamation, an increase of approximately 30 percent compared to the pre-mining acreage. Impacts of clearing wetland hardwood and coniferous forests include the reduction of available habitat for wildlife, as well as loss of wetland functions of water storage and treatment. Wetlands adjacent to active mining areas may be impacted through temporary lowering of water levels, increased surface runoff, and sedimentation. Hydroperiod alterations and increased sedimentation would be avoided through the installation of silt fences and the recharge ditch and berm system, which is designed to maintain water levels and prevent impacts to vegetation in wetlands adjacent to active mining areas. Methods to reduce impacts to adjacent wetlands and reclaim mined lands as hardwood and coniferous wetlands are discussed in Section 4.2.1.7.

Parcels of upland forest (FLUCFCS 400) and woodland pasture (FLUCFCS 213) claimed as USACE jurisdictional wetlands and proposed for mining would be mitigated through the creation of mixed wetland hardwood and wetland coniferous forest communities.

Non-Forested Wetlands

USACE jurisdictional non-forested wetlands (FLUCFCS 640 and parcels of FLUCFCS series 200 and 300) comprise 2,304.1 acres of the Ona site, approximately 11 percent of the entire property. IMC proposes to disturb or mine 1,595.6 acres (69 percent) of non-forested wetlands, not disturb 708.5 acres (31 percent), and reclaim 1,611.8 acres. The total post-reclamation area of non-forested wetlands is projected to be 2,320.4 acres, which is less than a one percent increase compared to pre-mining acreage.

Of the 1,159.6 acres classified as freshwater marsh, 733.6 acres (63 percent) would be disturbed or mined. Impacts include loss of habitat and wetland functions such as water storage and treatment. Clearing non-forested wetlands and subsequent mining activities may also impact adjacent undisturbed wetlands through increased surface runoff and hydroperiod alterations. Turbidity control measures and the perimeter recharge ditch system would be utilized to prevent impacts to adjacent wetlands.

DRAFT

A small amount (1.2 acres) of the Ona site is classified as emergent aquatic wetlands. These areas are proposed for mining, and 2.8 acres of emergent aquatic wetlands are included in the reclamation plans. In addition to these reclaimed areas, vegetation common in emergent wetlands would be found in the littoral zones of the reclaimed lake systems.

Shrub swamps comprise 696.5 acres of the Ona site, 513.6 acres of which are to be mined. Reclamation activities would include the creation of 158.5 acres of shrub swamp to replace lost habitat. Impacts of clearing shrub swamps include the loss of native vegetation, wildlife habitat, and wetland hydrologic function. It should be noted that areas classified as shrub swamps include communities dominated by undesirable species such as primrose willow (*Ludwigia sp.*) and coastal plain willow (*Salix caroliniana*), which become dominant as a result of drainage alterations, heavy grazing, and/or fire suppression in freshwater marsh habitats (IMC, 2002). Desirable shrub swamps are those dominated by buttonbush (*Cephalanthus occidentalis*), which unlike willow-dominated swamps, allow enough light through the canopy to support a diverse assemblage of herbaceous wetland species. Therefore, shrub swamps would be mitigated primarily through the creation of additional wet prairie and freshwater marshes. Of the 158.5 acres of created shrub swamp, 31.7 acres would be mitigated offsite at the FG-3 reclamation program area. Reclamation techniques for non-forested wetlands are described in Section 4.2.1.7.

4.2.1.2 Matrix Transport

4.2.1.2.1 <u>Slurry Matrix Transport (IMC's Proposed Action)</u>

Slurry matrix transport would impact native vegetative communities only in those limited areas where construction of the transport system and pipeline would result in disturbance in advance of mining or at the stream crossings. Additional impacts may arise in the unlikely event of pipe rupture and subsequent release of slurry into natural areas. To avoid discharge to natural areas, the slurry matrix pipeline would be located on the mining side of the ditch and berm system. At stream crossings, the slurry matrix pipe would be encased, and in the event of a rupture, the contents would be captured in the containment area and the ditch and berm system to avoid contact with the stream channel.

4.2.1.2.2 <u>Conveyor Transport</u>

Impacts to vegetative communities resulting from the construction of a conveyor system for matrix transport would be identical to the impacts of the proposed action, slurry matrix transport. As with the slurry matrix pipeline, the conveyor system would be located on the mining side of the ditch and berm system, and in the case of a spill, the matrix would be captured to prevent any impacts to natural areas.

DRAFT

4.2.1.3 Matrix Processing

4.2.1.3.1 Wet Process Beneficiation (IMC's Proposed Action)

Wet Process beneficiation has the following environmental considerations: the aboveground storage of waste clays, dam failures, and the storage and use of reagents. The system of wet processing beneficiation is not likely to produce any adverse impacts to vegetative communities. Possible impacts may arise in the event of a spill at the reagent storage yard. However, this scenario is not likely due to the location of the reagent storage within the beneficiation plant and secondary containment structures for the reagent tanks. A discussion of the potential impacts associated with above ground storage of waste clays is included in Section 4.2.1.6.

4.2.1.4 Plant Siting

4.2.1.4.1 IMC's Proposed Plant Location

The construction of the new 150-acre Ona beneficiation plant would likely commence no earlier than Ona mine year three, and would require 24 to 36 months to construct. The proposed plant site is currently dominated by pastures (80.8 acres), with 18.8 acres of live oak, 23.6 acres of shrub swamp, 18.4 acres of freshwater marsh, and 8.4 acres of mixed upland hardwood/conifer forests. Land clearing and preparation prior to construction of the beneficiation plant would result in the loss of predominantly agricultural areas, which do not harbor important native vegetative species. The proposed plant location includes 46.8 acres of wetland habitat. Half of the acreage consists of willow-dominated shrub swamps, which are not as ecologically significant compared to forested wetlands or diverse freshwater marshes.

4.2.1.4.2 Other Plant Locations

Plant Site #1 is currently vegetated with a mixture of unimproved pasture, palmetto prairie, freshwater marshes, and mixed hardwood/conifer forests. It is situated immediately adjacent to a high-quality mixed wetland hardwood forest contained within Conservation Area #9 (Figure 2.2-4). Impacts of locating the beneficiation plant at Site #1 include the loss of habitat and secondary impacts due to the proximity to Conservation Area #9. Construction and operation of the beneficiation plant adjacent to this area would reduce the vegetative buffer surrounding Conservation Area #9 and may adversely impact the existing habitat for wildlife and threatened and endangered plant species. Additionally, reclamation plans include the creation of a contiguous parcel of mixed wetland hardwood forest from Conservation Area #9 in Section 17 southward into Section 29, which includes the area designated as Site #1. The creation of this habitat conservation corridor would not be feasible if Site #1 were utilized for construction of the new beneficiation plant.

Site #2 is south of the original site, and is in an area that is close to roads and railroads. This site is located within Conservation Area #11, which contains high quality forested wetlands and palmetto rangeland surrounded by contiguous natural plant communities. Location of the beneficiation plant within Conservation Area #11 would result in the clearing of over 150 acres of habitat, including shrub marsh, live oak, freshwater marsh, and temperate hardwood communities that would otherwise be preserved. Construction and operation of the beneficiation plant at Site #2 would decrease the value of Conservation Area #11 through fragmentation of habitat.

4.2.1.5 Water Management

4.2.1.5.1 Process Water Sources

During mining, rainfall runoff from active mining areas would be captured for use in the beneficiation and mining processes. Surface water capture would reduce the amount of precipitation reaching adjacent vegetative communities, but the impact is temporary and would allow a substantial reduction in groundwater withdrawals. For example, as shown in Table 2.2-3, surface water capture and water conservation measures have resulted in reductions in the use of groundwater by approximately 50 percent during the period from 1991 through 1999. Surface water capture could result in additional secondary impacts to wetland vegetation through decreased hydroperiod during the period of surface water capture (the time between initiation of mining and reclamation activities) at each mine cut. A decrease in wetland hydroperiod may allow encroachment by upland vegetation and loss of hydrophytic species. In order to minimize impacts to wetland vegetation adjacent to active mining areas, IMC would construct perimeter berm and swale systems (recharge ditches) designed to maintain the water table and reduce the effects of a decreased hydroperiod on wetland vegetation. If the recharge ditches function as designed, they would preclude any effects on vegetation from reduced hydroperiod. Section 4.7 presents details about the construction and function of the perimeter berm and swale systems. Should this system fail to function as designed, the conditions of IMC's WUP would require alternate artificial hydration techniques be designed and used.

Supplemental water needs would be met with two wells withdrawing from the UFA. The two wells are permitted to withdraw an average of approximately 12 mgd, and a maximum of 16 mgd. By issuing the WUP, the SWFWMD has determined that no adverse impacts on groundwater resources or natural vegetative communities would occur. Therefore, surface water capture and groundwater withdrawals within permitted limits are not expected to adversely affect native vegetation.

4.2.1.5.2 Discharge to Surface Water

No impacts to native vegetation communities are expected because of discharges of wastewaters. Discharges from the clay settling areas are through permitted NPDES outfalls, which are monitored regularly and are required to meet State of Florida surface water quality criteria.

4.2.1.6 Sand and Clay Residuals Management

4.2.1.6.1 Conventional Settling (IMC's Proposed Action)

Conventional clay settling areas would be utilized to dispose of clay that would be physically separated from the saleable phosphate rock and sand. The clay settling areas are to be located on previously cleared and mined areas, therefore no adverse impacts to native vegetative communities would arise. The construction of clay settling areas would have the positive effect of providing additional aquatic habitat for the establishment of wetland vegetation during active mining. Currently, the Ona site contains only limited acreage of emergent aquatic vegetation. The shallow littoral zone found along the perimeter of clay settling areas would provide additional habitat for emergent wetland plants. Primary impacts may occur in the unlikely event of dam failure and subsequent release of clay waste and turbid waters into natural areas. The destruction of vegetation in adjacent streams, wetlands, and uplands could occur if large volumes of clay waste were released during a failure.

4.2.1.7 Reclamation

4.2.1.7.1 Conventional (IMC's Proposed Action)

IMC proposes to reclaim 15,836.1 acres of mined or disturbed lands to replace natural ecosystem functions on a portion of the Ona site, as well as to provide lands for agricultural and recreation/development uses. Twenty-eight FLUCFCS categories would be created, including both upland and wetland communities. Figures 4.2-5 though 4.2-11 illustrate the projected mining sequence, along with the subsequent projected reclamation sequence in five-year intervals over the life of the Ona Mine. A summary of the vegetative communities present on the 20,676-acre Ona site, and the acreage of each community that would be disturbed, preserved, and/or reclaimed is found in Table 4.2-1. Figure 3.2-1 details the location of each vegetative community, while the post-reclamation landscape is presented as Figure 2.2-12.

At a minimum, reclamation activities would fulfill the applicable obligations concerning post-reclamation vegetation conditions imposed by Chapter 62C-16, F.A.C. (1996), and Section 2.06.06 of the Hardee County Unified LDC (1998), as well as USACE wetland mitigation requirements. All post-mining reclamation activities would use native vegetation planting in order to eliminate irrigation needs, with the exception of improved pastures and those areas where the slope of the reclaimed land surface is such that erosion could result. In the cases of potential erosion hazard areas, initial seeding and/or sodding with a mixture of Bahia grass (*Paspalum notatum*) and other annual and perennial grasses would be used to quickly stabilize the soil. As the reclamation site matures, native species are expected to out-compete non-native grasses without the use of herbicides. Improved pastures (FLUCFCS 211) would be planted with species typical of Florida pastures, which are dominated by non-native Bahia grass (IMC, 2002).

The reclamation and revegetation plan would be completed in an average of 10 years following land clearing during the first 15 years of mining. Afterwards, the rate of reclamation would exceed the rate of mining such that all of the disturbed lands would be revegetated within six years following completion of mining operations.

A summary of both wetland and upland reclamation projects conducted by IMC is described in Appendix E, *Evidence Of Successful Reclamation*. Based upon previous reclamation results, reclaimed and revegetated agricultural lands reach maximum productivity within one year, and herbaceous rangelands and wetlands reach maturity in approximately three years. Forested upland and wetland communities would require 40 years to reach maturity, although much of their ecological functional capacity is realized in about 15 years. The existing patchwork of upland and wetland vegetation would be replaced with three large vegetative community types positioned and targeted towards three post-reclamation land uses: agricultural, recreation/development, and natural systems.

The agricultural lands would be positioned in the interior of the property over areas of clay soils and surrounded by coniferous forests, and shrub and brushland. The recreational/ development lands would be positioned along SR 64, Albritton and Vandolah Roads, and the Ona Rural Center community to eliminate the need for public capital facility outlays and to permit easy access. These lands would be reclaimed as large lakes surrounded by a park-like setting of grass and trees. The natural systems would be reclaimed to form a contiguous mosaic of upland and wetland forests, rangeland, and herbaceous marshes. These would include all of the north-south stream floodplain corridors as well as an east-west linkage to connect the stream corridors. The repositioning of natural vegetative communities from the current patchy distribution to a connected belt of natural communities would result in the best long-term opportunity for significant habitat improvement.

Watersheds Associated with Brady Branch and Oak Creek

The Brady Branch and Oak Creek stream systems would be reclaimed with a mosaic of marshes, wet prairies, swamp forests, and floodplain forests encompassing a channel restored to more natural conditions than currently exist. Portions of the creek system would be designed to mimic streams, with gradual slopes and sinuous channels. Velocity dissipaters would be constructed with branches. In addition to flow control, these areas would provide cover for fish and wildlife. Slopes would be stabilized by planting with herbaceous species including, but not limited to, maidencane, pickerelweed, duck potato, and sand cordgrass. These herbaceous species would be interplanted with trees including popash and bald cypress and shrubs such as buttonbush near the banks. Landward tree species would include red maple, elm, tupelo, dahoon holly, and laurel oak. At the edge of the floodplain forest, laurel oak, slash pine, live oak, sweetgum, and wax myrtle would be planted. Herbaceous species including, but not limited to, swamp fern, Virginia chain fern, lizard's tail, pickerelweed, iris, and Eastern gamagrass would be planted as appropriate along the hydrologic gradient. Swamp forests would be planted with similar species as the floodplain forest.

Hickory Creek Drainage Basin

The Hickory Creek watershed located on the eastern edge of the property would be reclaimed with a combination of natural communities including lake, freshwater marsh, wetland hardwood forest, wet prairies, and upland coniferous forests. The watershed has been severely altered for agriculture, and currently consists of a series of marshes and swamps interconnected by ditches and surrounded by pasture. A large lake is proposed as reclamation in Sections 14, 15, 22, and 23, Township 34 South, Range 24 East. Outflow from this lake would be directed south across a perimeter marsh and then through a sinuous path revegetated as wetland hardwood forest with a small stream channel beneath the tree canopy. The reclaimed watercourse would drain into Hickory Creek in Section 27, Township 34 South, Range 24 East. Lands surrounding the reclaimed watercourse south of the lake would contain a large contiguous area of natural systems including herbaceous marshes, wet prairie, upland coniferous forests, and pine flatwoods as seen on Figure 2.2-12.

Brushy and Horse Creeks

The floodplains of Brushy Creek, Horse Creek, and the West Fork Horse Creek would be preserved as no-mine areas, with the exception of required access corridors. These corridors would be reclaimed upon completion of mining to match the pre-mining vegetative conditions. The floodplains of Brushy and Horse Creeks would be preserved in perpetuity through the granting of Conservation Easements.

A description of reclamation activities and conceptual approaches for each vegetative community type is described below.

A. Upland Communities

Only a limited amount of research has been conducted on the reclamation of native upland communities as compared to wetland reclamation. However, IMC has successfully restored several communities previously considered to be unreclaimable, including xeric scrub and pine flatwoods, and ongoing research conducted by FIPR, the Nature Conservancy, Tall Timbers, Disney, and the phosphate industry will improve the success rate of future upland reclamation projects. Significant acreage of upland communities are not planned to be reclaimed for ten to 15 years based upon the proposed mine sequence, during which time researchers will continue to advance the state-of-the-art in upland reclamation. These refinements and techniques would be used by IMC to ensure that the reclamation of upland communities is successful.

The reclamation plans include 11,528.4 acres of upland communities, which would result in a total of 14,886.2 acres of uplands at the Ona site at the conclusion of reclamation. This corresponds to a ten percent loss in acreage of upland vegetative communities between the pre- and post-mining landscape. The reduction in acreage of upland communities arises from the reclamation of improved and unimproved pastures to other land uses, and does not reflect a loss of upland forest acreage.

FLUCFCS 200, Agricultural Uses

IMC proposes to mine 7,815.8 acres of agricultural lands, not disturb 602.1 acres, and reclaim 6,119.1 acres. The total post-mining area of agricultural lands is projected to be 6,721.2 acres, which corresponds to a loss of approximately 20 percent of the pre-mining acreage. Reclamation activities for each agricultural land use are discussed below.

Improved Pasture

IMC plans to mine 7,000.4 acres of improved pasture, encompassing approximately 96 percent of the total acreage of improved pasture on-site. The remaining 305.8 acres would remain undisturbed during the lifetime of the mine.

IMC's reclamation plan includes 4,955.9 acres of improved pasture, which would result in a total of 5,261.7 acres of improved pasture upon completion of reclamation. This corresponds to a net loss of 2,044.6 acres of improved pasture, which is approximately 28 percent of the total pre-mining acreage. Over 4,900 acres would be revegetated for immediate use as improved pasture, but these lands would also be suitable for more intensive agricultural uses such as vegetables and row crops. All of the improved agricultural lands would be established on clay soils following the consolidation of clay settling areas. According to the Polk County Extension Service, the soils of reclaimed clay settling areas possess superior agronomic properties, including calcium and phosphorus content, moisture retention, and cation exchange capacity. Thus, these soils would be the preferred growing medium for forage and cropland.

Seed mixture and soil amendment requirements would be determined based upon research by the University of Florida and the Polk County Extension Service. Typical species to be planted would include a mixture of seasonal and permanent ground cover. Seasonal species such as millet and rye would germinate quickly to provide a cover crop for the more permanent grasses such as Bahia and Bermuda.

Woodland Pasture

IMC's reclamation plan proposes to reclaim 1,163.2 acres of woodland pasture (FLUCFCS 213), and when combined with the undisturbed woodland pasture areas would result in a total of 1,432.3 acres post-reclamation. This corresponds to a net gain of 794.9 acres of woodland pasture, or an increase of approximately 125 percent compared to the total pre-mining acreage.

Woodland pastures would be reclaimed in the areas that could potentially be developed in the future for residential, commercial, and recreational purposes. As such, all woodland pastures would be reclaimed on recontoured overburden, either in the form of a "cap" over sand tailings backfill, or as available on mined lands. These reclamation and revegetation practices have been successfully completed for the past 40 years.

The groundcover seed mixture and soil amendment requirements would be identical to the reclamation of improved pasture. In addition, trees would be planted to achieve a park-like setting, however, these areas would not resemble upland forests (level 400 series associations). The tree species would include a mixture of pines and upland oaks.

FLUCFCS 300, Rangeland

Rangeland comprises 3,053.9 acres of the Ona site, approximately 15 percent of the entire property. The majority of lands at the Ona site classified as rangeland are palmetto prairies, which comprise 2,898 acres of the current landscape. IMC proposes to mine 2,530.3 acres of rangeland, not disturb 523.6 acres, and reclaim 2,470.3 acres. The total post-mining area of rangeland would to be 2,993.9 acres, which corresponds to a decrease of approximately two percent in pre-mining acreage. Rangeland reclamation activities for each rangeland community are discussed below.

Shrub and Brushland

Approximately 673.2 acres are to be reclaimed as shrub and brush rangeland (FLUCFCS 320). These areas would be interspersed adjacent to and between upland and wetland natural habitat to broaden the core-corridor "areas of conservation interest" and to link these areas into a contiguous post-reclamation natural system. Shrub and brushland would also be created as a buffer surrounding agricultural areas on reclaimed settling areas.

Natural rangeland communities would be established on recontoured overburden soils, both on lands backfilled with sand tailings and lands where only overburden is present. Soil types and site-specific hydrology would be considered when selecting species to be planted, as native rangeland includes xeric, mesic, and hydric communities. A diverse assemblage of species would be planted, as available from native plant nurseries, including but not limited to saw palmetto, wiregrass, and muhlygrass.

Palmetto Prairie

Reclamation plans would include 1,797.2 acres of palmetto prairie (FLUCFCS 321), resulting in a total of 2,288.5 acres of palmetto prairie upon completion of reclamation. This represents a net loss of 609.5 acres, or 21 percent of the total acreage currently vegetated as palmetto prairie.

Conceptually, mined land would be reclaimed as palmetto prairie development by creating a landform similar to a pine flatwood community, but without the canopy of pines. Topsoil from palmetto prairie areas scheduled for mining, when feasible, would be transported to the reclamation sites where feasible for the same purposes as indicated in the pine flatwoods reclamation. In addition, commercially available native grass seed including Indiangrass (*Sorghastrum* sp.), bluestem (*Schizachyrium* sp.), and switchgrass (*Panicum virgatum*) would be sown over portions of the reclaimed sites to create a rapid groundcover to provide wildlife food and inhibit the establishment of undesirable plants. Saw palmetto, running oak and other indigenous species would be planted as needed to achieve coverage on the site, and nuisance species would be controlled with selective herbicides and fire management. Planted species would be selected giving priority to those with extensive underground development that have adapted to the frequent fire exposure.

FLUCFCS 400, Upland Forests

IMC plans to mine 2,766.6 acres of upland forests, not disturb 2,232.1 acres, and reclaim 2,939 acres. The total post-reclamation area of upland forest is projected to be 5,171.1 acres, which corresponds to an increase of approximately three percent compared to the pre-mining acreage. Reclamation activities for each type of upland forest community are discussed below.

Pine Flatwoods

Reclamation of mined lands include the creation of 493.1 acres of pine flatwoods (FLUCFCS 411), which when added to the undisturbed areas results in a total of 1,029.5 acres. This represents a net loss of 450.1 acres of pine flatwoods in the post-mining landscape, or approximately 30 percent of the present acreage. However, 1,243 acres of mined lands would be reclaimed as upland coniferous forest (FLUCFCS 410), which are structurally similar to pine flatwoods with the exception of understory species composition.

Pine flatwoods reclamation projects on disturbed soils are ongoing in several sites including those funded by the water management districts and privately funded efforts being conducted by IMC, CF Industries, Inc., Cargill Fertilizer, Inc., Disney, Nature Conservatory, and Tall Timbers. The FIPR is currently funding several research studies aimed at producing large quantities of native grass seeds including wiregrass, which could become commercially available for pine flatwoods restoration and reclamation project sites.

Conceptually, in order to reclaim mined lands to pine flatwoods, overburden and other fill, which may include sand tailings, would be rough graded as necessary. When feasible, suitable topsoil from pine flatwood areas scheduled for mining would be transported to the site and used as a top dressing several inches thick to provide the desirable seed bank, organic matter, and microorganisms. Strips of topsoil may be used to inoculate the site where a complete cover is infeasible. Supplemental plantings, if required, may include (but are not limited to) saw palmetto, gallberry, tarflower, bunch grasses, and wiregrass. Seed would be added in bare areas or areas where topsoiling appears to be unsuccessful in providing adequate plant materials. Longleaf and South Florida slash pines would be planted at a density of 200 trees per acre. Nuisance species invasion would be controlled with selective herbicides.

Factors that present challenges to the reclamation of pine flatwoods include hydroperiod, soil characteristics, control of nuisance invading plants, and fires. Pine flatwoods are by definition flat and it is this topography that assists in creating the desired hydroperiod. Soils comprised of low nutrient, permeable, acidic sands discourage the growth of nuisance invader plants and favor plants adapted to pine flatwoods communities. The normal fire frequency for pine flatwoods is every one to three years. In reclamation projects, fire would be excluded for several years to allow establishment of the pines and to build a seed source unless it is deemed an appropriate management tool.

Upland Hardwood Forest Reclamation

Approximately 816.7 acres would be revegetated as upland hardwood forest communities (FLUCFCS 425, 427, and 438). These areas would principally be interspersed between and adjacent to the "no-mine areas of conservation interest" and other reclaimed upland and wetland natural communities to broaden the core-corridors and link these areas into a contiguous post-reclamation natural system.

Upland hardwood forest communities would be planted on recontoured overburden soils, sometimes after backfilling with sand tailings, graded to design elevations. First, understory would be established to stabilize the soils. Soil types and hydrology would be considered when selecting the species to be planted. For 400 series oak hammocks, switchgrass (*Panicum virgatum*) would be seeded to provide cover and wildlife food. Generally, groundcover in oak hammocks is sparse due to dense canopy coverage. Initially, reclaimed areas projected to become oak hammocks over time would be seeded with non-persistent grasses such as millet or winter rye to stabilize the soil and provide competition for non-desirable plant species. As these hammocks mature, it is anticipated that groundcover species common to these communities would develop form dispersal from animals as well as wind. Characteristic shrubs such as black haw (*Virburnum obovatum*) in mesic or hydric laurel oak hammocks or mixed hammocks and French mulberry (*Callicarpa americana*) in live oak or drier mixed hammocks would be planted simultaneously with tree plantings. At the ecotone of reclaimed 400 series hammocks bordering wetlands, a band of Eastern gamagrass (*Tripsacum dactyloides*) or sand cordgrass (*Spartina bakeri*) would be planted. All native trees and shrubs would be selected corresponding to the respective habitat and obtained from local nurseries; tree planting rates would approximate 600 seedlings per acre.

Xeric Forest Reclamation

Reclamation plans include the creation of 386.2 acres of sand pine (FLUCFCS 413) and sand live oak (FLUCFCS 432) forest, which when added to the undisturbed areas results in a total of 463.4 acres. This represents an increase of 35.5 acres of xeric forest in the post-reclamation landscape, or approximately eight percent of the present acreage. Xeric forests would be reclaimed in the Horse Creek watershed to form "scrub islands" analogous to those that existed historically. These areas would be positioned contiguous to the proposed post-reclamation natural systems corridor adjacent to Horse Creek. Figure 2.2-12 illustrates the series of xeric communities proposed for planting west of Horse Creek.

All xeric areas would be reclaimed on mined lands that have been backfilled with sand tailings to produce hydrologic conditions similar to natural scrub habitats. Depending upon scheduling and logistics, topsoil from other existing areas may be used as a seed source. In particular, topsoil from the "boneyard" scrub area (Section 16, Township 34 South, Range 23 East) would be removed and relocated to reclamation areas to provide a seed bank of native xeric species. Planting of sand live oak, sand pine, longleaf pine, and other xeric canopy species, as appropriate for the level III code and as available from native plant nurseries, would be completed at a rate of 600 seedlings per acre. In addition, sub-canopy and groundcover supplemental plantings may be completed, dependent upon the level of seed source productivity of any translocated topsoil. At a minimum, wiregrass (*Aristida beyrichiana*) would be planted. It is anticipated that groundcover would become established from the donor mulch. However, common grasses in xeric communities such as *Andropogon sp.* are wind dispersed and would likely establish naturally over time. Other grasses such as *Dichanthelium sp.* and *Aristida sp.* (other than *A. beyrichiana*) are animal dispersed and are also expected to appear over time.

B. FLUCFCS 500, Water

IMC proposes to reclaim 1,034.5 acres of mined lands as open water, predominantly in the form of lakes. The total post-reclamation area of open water is projected to be 1,065.2 acres, which corresponds to an increase of 821 percent compared to the pre-mining acreage. Reclamation activities for each type of open water community are discussed below.

Natural Streams

IMC proposes to reclaim 0.5 acres of natural stream habitat (FLUCFCS 511) resulting in a post-reclamation total of 13.8 acres of streams, a net loss of 7.1 acres (34 percent). It should be noted, however, that many natural stream channels are included in areas classified as stream swamp (FLUCFCS 615) due to the closed canopy over the stream channel. Stream swamp habitat would be increased by 15 percent following reclamation activities.

Natural streams would be created in the same manner as the stream swamps (FLUCFCS 615) discussed below. However, the tree plantings would be positioned such that complete canopy closure over the watercourse channel would not occur. Figure 4.2-12 illustrates a typical reclamation stream and associated floodplain.

Man-made Ditches

During reclamation activities, 0.6 acres of man-made ditches (FLUCFCS 512) would be created for a post-reclamation total acreage of 16.1 acres, a decrease of 58.5 acres (78 percent) compared to the pre-mining landscape.

The drainage watercourses that would connect reclaimed settling areas with the adjacent natural communities are classified as ditches, as is one ditch that would be used to direct flow across a reclaimed settling area. All ditches would be positioned on former clay settling areas.

Lakes/Reservoirs

Currently, all lands classified as reservoirs/lakes at the Ona site are man-made cattle ponds (FLUCFCS 534). These cattle ponds comprise 20.2 acres, 18.3 (91 percent) of which would be disturbed during mine operation. Reclamation plans include a total of 14 acres of reservoirs that are less than ten acres in size to provide replacement cattle ponds, 453.9 acres of lakes between ten and 100 acres (FLUCFCS 523), and 565.4 acres of lakes between 100 and 500 acres (FLUCFCS 524). The acreage of open water at the Ona site would be increased from 115.7 acres to 1,065.2 acres once reclamation is complete.

The creation of lakes would provide recreational and aesthetic values for the residents of Hardee County as well as habitat for a number of wildlife species. In order to provide recreational opportunities without increasing vehicular disturbance within the interior habitat corridors, lakes would be positioned near the Ona Rural Center Community along SR 64 and Albritton Road.

DRAFT

Lakes would be constructed in accordance with the requirements of Chapter 2.06.06 of the Hardee County Land Development Code by regrading overburden to form the largest practical depressions at each lake site. All lakes would be surrounded by littoral zones and would be positioned such that woodland pastures, forested upland, or wetland communities would surround the lakes.

C. FLUCFCS 600, Wetlands

Reclamation plans include 3,898.5 acres of wetland communities including the 31.7 acres of off-site mitigation at the FG-3 reclamation program area and the lakes discussed above, which would result in a total of 6,034.6 acres of wetlands at the Ona site once mine reclamation is complete. This corresponds to an overall 23 percent increase in wetland acreage between the pre- and post-mining landscape. When jurisdictional areas within open water lake habitats are excluded, the pre-mining and post-reclamation landscape includes 4,841.9 and 4,985.9 acres of wetlands, respectively. This represents a four percent increase in wetland acreage post-reclamation.

The existing acreage of USACE jurisdictional areas by FLUCFCS code, acreage to be disturbed, and acreage to be mitigated is found in Table 4.2-2. Mitigation for wetland impacts would involve the creation of wetlands during the reclamation process. Wetlands created to fulfill proposed USACE mitigation are a subset of the wetlands that would be created as part of the reclamation plan. Due to discrepancies between the USACE and FDEP's jurisdictional wetland determinations, there are small differences in the acreage of wetlands being created as part of the state reclamation plan versus the mitigation plan for USACE jurisdictional wetlands. For example, USACE wetland mitigation would propose mitigation for 69.2 acres of disturbed bay swamp, whereas FDEP mitigation rules would propose replacement of 99.5 acres of disturbed wetlands during reclamation. However, most FLUCFCS show no difference between reclamation and mitigation, and the number of acres of proposed mitigation is always met, and often exceeded.

The locations and identification numbers of wetlands to be created are shown in Figure 4.2-13. Figure 2.2-12 illustrates the location of post-reclamation vegetative communities by FLUCFCS code.

An overview of proposed wetland reclamation techniques for each wetland vegetative community type are presented below.

Wetland Mulch

Whenever practical, topsoil from wetlands to be mined would be removed during clearing to be used as mulch for reclamation wetlands. Excavated wetland mulch or muck from donor sites can be advantageous in the reclamation of certain types of wetlands to: 1) provide nutrients, 2) provide a seed source, and 3) improve the substrate for adapted plants. The optimum situation would be to transfer nuisance species-free material directly from a similar wetland donor site to the recipient reclamation site and provide the hydrology to support the new system. This opportunity seldom exists in the mining and reclamation sequence. Therefore, some variation of the optimum situation, including stockpiling wetland muck or reclamation without muck would be necessary. Stockpiling of mulch introduces problems with oxidation of organic matter, germination of nuisance species, and maintenance of seedbank viability. One method to minimize oxidation of organic material and avoid the germination of nuisance species is to store the muck below water if it is to be stockpiled for any length of time. This method is successful if a storage site is available, although the double handling of material and water management can add significantly to the cost of reclamation. Additionally, the advantage gained by not exposing muck to oxidation may be offset by the inability to recover all of the muck from the below ground storage site. Wetland plant seeds and vegetative material can survive for many years in the stockpiled muck, and IMC has experienced success using stockpiled muck at many reclamation sites. Direct planting of reclaimed wetlands is equally successful. Typically, planting is not done on sites that receive muck from donor sites. In each case, IMC has the responsibility to meet the criteria established in the permitting process for reclaimed wetlands.

Bay Swamps

Reclamation plans include 127.1 acres of bay swamps (FLUCFCS 611), which when combined with the undisturbed acreage results in a total of 154.1 acres post-reclamation, an increase of approximately 22 percent from the pre-mining acreage. The 127.1 acres that would be created exceeds the 110.8 acres of bay swamps claimed as jurisdictional wetlands by the USACE.

Conceptually, bay swamp would be reclaimed by grading to appropriate contours, adding suitable organic mulch (if available) planting with suitable vegetation, and performing maintenance against invasion by noxious vegetation. Bay swamps would be designed as shallow depressions (three to six feet deep) set into sloping uplands. They would have irregular but more-or-less level bottoms, gradual slopes (10:1) towards the upland boundary, and slightly steeper (4H:1V or steeper, if approved by FDEP)side slopes for up to 80 percent of their perimeter. The steep side slopes would provide seepage of groundwater from the surrounding uplands. The down-slope boundary would allow drainage of excess water. Elevations would be designed so that the bottom of the bay remains saturated throughout most of the year. A typical cross section drawing for bay and gum swamps is provided in Figure 4.2-14, and cross sections of each proposed bay swamp to be created are presented in the Section 404 permit application. Organic matter in the form of mulch harvested from existing (to be mined) bayheads, if available, would be spread across the depression. In addition to providing a source of seeds and other propagules, this material facilitates the survival and growth of planted bay trees.

DRAFT

Typical vegetation for planting bay and gum swamps is presented in Table 4.2-6. Trees would be planted at densities to assure 400 surviving trees per acre. These would include sweetbay, swamp bay, loblolly bay, red maple, hackberry (*Celtis laevigata*), American elm (*Ulmus americana*), and blackgum (*Nyssa sylvatica*). Herbaceous species would be planted to include pickerelweed, cinnamon fern, royal fern, chain ferns, lizard's tail, and green arrow arum. The steep side slopes may be planted with Bahia grass or a temporary cover such as millet to reduce erosion.

Maintenance would consist of protecting the site from vehicular traffic, cattle grazing, and hog rooting, to the extent practical, as well as periodic removal of noxious vegetation until reclaimed. Bay swamp sites would also be protected from fire.

Gum Swamps

Approximately 32.3 acres of mined land would be reclaimed as gum swamp (FLUCFCS 613), resulting in a post-reclamation total of 33.4 acres, a 29 percent increase compared to the pre-mining acreage.

Conceptually, IMC would reclaim depressional swamps by grading to appropriate elevations, mulching, planting, and controlling noxious vegetation. A typical cross section drawing for bay and gum swamps is provided in Figure 4.2-14. A layer of suitable organic mulch harvested from existing wetlands would be placed on top. Since the hydrology of perched systems derives only from surface runoff, the elevation design must also include surrounding uplands in order to ensure an adequate water supply.

Typical vegetation for planting bay and gum swamps is presented in Table 4.2-6. Trees and shrubs would be planted to assure 400 surviving trees per acre and would consist primarily of swamp tupelo and/or cypress as well as red maple, laurel oak, popash, Virginia willow, wax myrtle, and buttonbush. Herbs would be planted including maidencane, pickerelweed, dayflower, lizard's tail, and *Bacopa spp.*

The sites would be protected from vehicle traffic and cattle grazing as well as maintained to prevent the establishment of noxious vegetation until reclaimed.

Evidence of IMC's ability to create bay and gum swamps is represented by the Alderman Creek Bay Swamp project in Hillsborough County at the Four Corners Mine. Through the use of a variety of planting techniques, the objective was to create immature bay swamps that would mature into systems similar to those observed on undisturbed lands. Results to date include evidence that the hydrology is adequate, preliminary survival rates are encouraging, and wildlife utilization has been immediate.

DRAFT

Stream Swamps

Following mining activities, 40.9 acres of mined lands are to be reclaimed as stream swamps (FLUCFCS 615), resulting in a post-reclamation total of 74.3 acres; a 15 percent increase compared to the pre-mining acreage.

Conceptually, reclamation of stream swamps would consist of grading a longitudinal depression to act as a floodplain, establishing ground cover, introducing water flow, planting appropriate vegetation, and maintenance of noxious vegetation. To create flowing water systems, land elevations would be designed to match elevations at the water source and downstream where the newly developed swamp meets natural habitat. The cross-sectional elevations would be designed to provide a floodplain adjacent to the watercourse and to maintain sufficient soil moisture during the dry season. If available, mulch from existing wetlands would be spread across the reclamation site to provide an organic enrichment to the soil and to introduce wetland plant propagules to the site. Logs and dead trees would be placed randomly within the floodplain with their trunks perpendicular to the flow direction to encourage meanders in the watercourse and create structural heterogeneity to increase habitat diversity for aquatic animals (Figure 4.2-12). Cross sections of each stream swamp to be created are presented in the Section 404 permit application.

Typical vegetation for planting stream hardwood swamps is presented in Table 4.2-7. Trees and shrubs would be planted at a density to assure 400 surviving trees per acre. Species would include laurel oak, red maple, sweetbay, popash, American elm, dahoon holly, cypress, wax myrtle, black haw, and Carolina willow (*Salix caroliniana*). Herbs would be planted to include pickerelweed, maidencane, lizard's tail, chain ferns, cinnamon fern, and golden club (*Orontium aquaticum*). Flowing water increases the potential for erosion. Therefore, it is important to establish a ground cover as quickly as possible. Sunlight demanding species may be used for the initial ground cover. They would be shaded out as the forest canopy develops. Supplemental plantings of shade-tolerant plants may be required after the canopy closes. The sites would be protected from vehicle traffic and cattle grazing as well as maintained to prevent the establishment of noxious vegetation until released. Evidence of IMC's ability to create stream swamp communities is represented by the Dogleg Branch and Halls Branch stream restoration projects, where wetland tree and herbaceous plantings have resulted in high plant diversity similar to that of the undisturbed wetlands before mining.

Mixed Wetland Hardwoods, Wetland Coniferous Forest, and Wetland Mixed Hardwood-Coniferous

Post-mining reclamation plans call for 704.6 acres of mined lands to be reclaimed as mixed wetland hardwoods (FLUCFCS 617), which would result in a total of 1,285.2 acres upon the completion of reclamation. This represents a net gain of 236.7 acres (23 percent) compared to the pre-mining acreage.

Wetland coniferous forests (FLUCFCS 620) would be created on 107.5 acres of mined lands during reclamation activities. When added to the undisturbed acreage, the post-reclamation total of wetland coniferous forest is 109.4 acres, an increase of 80.7 acres (281 percent) compared to the pre-mining acreage. An additional 260 acres of mined lands would be reclaimed as wetland mixed hardwood-coniferous forest (FLUCFCS 630). The total post-reclamation acreage would be 315.7 acres, a 130 percent increase compared to the pre-mining acreage.

Conceptually, mixed hardwood, coniferous, and mixed hardwood-coniferous swamps would be reclaimed by grading to appropriate elevations, mulching, planting, and maintaining to control noxious vegetation. If enough quality material were available, a muck layer two- to four-inches in depth would be established. The understory would be planted with a typical mix of desirable herbaceous wetland plants on three-foot centers to provide cover and competition for invasive species. Trees would be planted at a density to achieve a final 400 trees per acre with trees greater than 12 feet in height after five growing seasons. Typical vegetation for planting in mixed wetland hardwoods is presented in Table 4.2-7. Typical vegetation for planting in wetland coniferous forests is presented in Table 4.2-8, while Table 4.2-9 presents the typical planting list for mixed hardwood-coniferous swamp. Species include those plants listed as "Typical", "Associated", or "Additional" species for swamps in "A Guide to Selected Florida Wetland Plants and Communities" (USACE, 1988). Exotic and nuisance species would not exceed ten percent relative cover in the ground cover and ten percent of the total number of trees in the canopy.

Mixed wetland hardwood swamps would be planted with species detailed in Table 4.2-7, so that no individual species is dominant. For mixed hardwood-conifer swamps, native conifers would comprise between 33 and 67 percent of the total number of trees in the canopy. Wetland coniferous forests would be similar in design to gum swamps with the exception of cypress as the predominant canopy tree. On wetter sites, common associates of cypress within the canopy-subcanopy layer would be black gum, red maple, American elm, pop ash, and water hickory. On less moist sites, cypress would be associated with laurel oak, sweet gum, and sweet bay.

Typical cross section drawings for mixed hardwood swamp, mixed hardwood-coniferous swamp, and wetland coniferous forests are provided in Figures 4.2-15, 4.2-16, and 4.2-17, respectively. Cross sections of each mixed hardwood swamp to be created are presented in the Section 404 permit application. Hardwood swamps would be designed to have an irregular bottom with the presence of hummocks or earthen platforms. Each wetland area would be evaluated prior to construction to determine the ranges of height and size of the

DRAFT

proposed hummocks, which would typically extend 0.5 to 1 foot above the water surface. The hardwood swamps would also have 10:1 or flatter side slopes and seasonal high water depths of 0.5 to one foot. Mixed hardwood-coniferous swamps and wetland coniferous forests would also be designed with 10H:1V or flatter side slopes, an irregular bottom with hummocks and a seasonal high water depth of about 0.5 feet.

The ecotone between forested wetland and upland habitats would be planted with a mixture of trees, shrubs, and herbaceous species typical of the transitional zone between wetland and upland habitats. Transitional trees and shrubs proposed for ecotones include those listed in Table 4.2-10 differentiated by the surrounding upland habitat. Herbaceous species planted in ecotones include species such as sand cordgrass (*Spartina bakeri*) and Eastern gamagrass (*Tripsacum dactyloides*).

Evidence of IMC's ability to create mixed wetland hardwoods, coniferous wetland forest, and mixed coniferous/hardwood forest is demonstrated by the AgEast, Morrow Swamp, AGR-FG 84(5) reclamation projects, all of which have been successfully released from all monitoring requirements.

Non-Forested Wetlands

Non-forested wetlands (FLUCFCS 640) include freshwater marshes, wet prairies, emergent aquatics, and shrub swamps. Additional areas of herbaceous USACE jurisdictional wetlands occur within parcels of pastures and rangeland. Non-forested wetlands comprise 2304.1 acres of the Ona site, approximately 11 percent of the entire property. Following mining, IMC proposes to reclaim 1,611.8 acres as freshwater marshes, wet prairies, emergent aquatics, and shrub swamps. When added to undisturbed areas, the total post-mining area of non-forested wetlands is projected to be 2,320.4 acres, which is an approximate one percent increase compared to the pre-mining acreage. Reclamation activities for each type of non-forested wetland community are discussed below.

Freshwater Marshes, Emergent Aquatics, and Shrub Swamps

Reclamation plans include 1043.9 acres of freshwater marsh (FLUCFCS 641), 2.8 acres of emergent aquatics (FLUCFCS 644), and 542.3 acres of shrub swamps (FLUCFCS 646). The total post-mining acreage of USACE jurisdictional freshwater marsh is 1,469.9 acres, an increase of 310.3 acres or 21 percent, compared to the pre-mining landscape. USACE jurisdictional shrub swamps would comprise 341.4 acres following reclamation, a reduction of 355.1 acres (51 percent) from the pre-mining landscape.

While reclamation plans call for the creation of 542.3 acres of shrub swamp, the proposed mitigation for USACE jurisdictional shrub swamps is only 158.5 acres, due to the isolated nature of the majority of shrub swamps on site. Of these 158.5 acres, 31.7 acres of shrub swamps would be mitigated offsite at the FG-3 reclamation program area. The total

DRAFT

acreage of shrub swamp following reclamation would be 735.3 acres, 341.4 acres of which would be considered USACE jurisdictional wetlands. The post-reclamation reduction in total acreage of USACE jurisdictional shrub swamps would be offset by the creation of additional acres of wet prairie and freshwater marsh. Wet prairie and marsh systems are specifically proposed to replace shrub swamps due to the historical conversion of marshes and wet prairies to willow-dominated shrub swamps attributed to the absence of seasonal fires.

To reclaim herb or shrub-dominated wetlands, either a layer of muck from donor wetlands would be applied or a combination of desirable native emergent species would be planted on 3-foot centers, resulting in approximately 4,800 plants per acre. Wetland herbaceous plants are generally planted on three-foot centers to provide a rapid revegetation and effective competition against nuisance invader species. Plants would be located dependent on the desirable water depth for each species and the zonation typically found in natural systems. Within the shrub marshes, native shrub species would also be planted on 10-foot centers. Planting lists for freshwater marsh and shrub marsh wetlands are presented in Tables 4.2-11 and 4.2-12, respectively. These include species listed as "Typical", "Associated", or "Additional" for shallow marsh and shrub marsh in "A Guide to Selected Florida Wetland Plants and Communities", published by the USACE Jacksonville District in 1988. The Florida Department of Environmental Protection's Bureau of Mine Reclamation requires success criteria for reclaimed non-forested wetlands to include a minimum of 70 percent desirable vegetation cover and ten percent relative cover of exotic and nuisance species.

Typical cross sections of reclaimed shallow marsh and shrub marsh wetlands are provided in Figure 4.2-18 and 4.2-19, respectively. Cross sections of each marsh to be created are presented in the Section 404 permit application. In the creation of shallow marshes, the grade would be established to allow a seasonal high water level of approximately two feet in depth. Shrub marshes would be constructed using ten to one or flatter side slopes. The seasonal high water depth for shrub marshes should be approximately 0.5 to one foot; deeper in areas intended for wading bird rookeries. Surrounding shrub "islands" with deepwater habitat encourages colonization by American alligators, which reduce the predation of wading bird eggs, nestlings, and fledglings by raccoons and other small mammals.

A majority of the created shrub marshes would be located on reclaimed clay settling areas. These wetlands would be designed and constructed consistent with the FDEP Bureau of Mine Reclamation's document "Guidance in the Reclamation of Forested and Herbaceous Wetlands on Phosphatic Clay Settling Areas." Specifically, reclamation of shrub marshes on former clay settling areas would incorporate the guidance parameters related to consolidation/topography, hydrology, revegetation, and monitoring. Clay consolidation

DRAFT

modeling using the SLURRY model provides estimates of topography and drainage conditions on the reclaimed clay settling areas. IMC is proposing to construct control structures in the reclaimed clay settling area dams or maintain the outlet swales at decreasing elevations until the rate of consolidation slows to a point that further consolidation would not result in water levels in the created wetlands that exceed the ranges acceptable to planted vegetation. Hydrologic modeling has been conducted to predict the hydrographs of water level elevations in and beneath wetlands created on reclaimed clay settling areas. Modeling results would be utilized to design and construct water control structures or maintain outlet swales in the regraded clay settling area dams to maintain water levels at targeted levels. Initial planting of shrub swamps would include species listed in Table 4.2-12 with subsequent planting, maintenance, and monitoring until success criteria have been met. Of the 574.2 acres of shrub swamp to be mined, only 513.6 acres are considered USACE jurisdictional wetlands. The proposed mitigation for impact to USACE jurisdictional shrub swamps involves the creation of 158.5 acres (including 31.7 acres of off-site mitigation), whereas reclamation activities involve the creation of 542.3 acres of shrub swamp. Therefore, the acreage of shrub swamp proposed for reclamation far exceeds the acreage proposed for mitigation of USACE wetland impacts.

Most of the shrub swamps that would be cleared are low quality primrose-willow dominated marshes. These areas exhibit low plant diversity and minimal wildlife usage when compared to buttonbush-dominated or mixed shrub marshes. Reclaimed shrub marshes would be designed and planted to support diverse vegetative communities that exceed, or at least equal, the biological functions of shrub marshes currently existing at the Ona site. Evidence of successful wetland creation on reclaimed clay settling areas includes IMC's Fort Green, Clear Springs, and Phosphoria mines. These include shrub marshes, forested wetlands, herbaceous wetlands, and open water habitats with minimal coverage of nuisance species that are actively utilized by wildlife.

Isolated/Ephemeral Wetlands

Although not USACE jurisdictional wetlands, isolated wetlands are taken into consideration by the USACE when assessing secondary and cumulative impacts, especially relative to their position in the habitat corridor and their use by migratory waterfowl. . The reclaimed wetlands at the Ona site would be established as hydrologically contiguous, connected, or isolated systems. Contiguous wetlands are those that are installed side-by-side to one another such as a hardwood swamp surrounded by a freshwater marsh. Contiguous wetlands are typically established along drainageways. Connected wetlands are those that are directly connected to a drainage system via a stream channel. Isolated wetlands are completely closed systems that receive hydrological input mainly from rainfall and/or surface runoff and groundwater inflow.

Isolated wetlands can be further defined as forested or herbaceous wetlands that are not connected by surface water to rivers, lakes, or streams. They are usually seasonally flooded. An analysis of representative created isolated wetlands, including expected hydroperiod, depth of water, and average stage is presented in Table 4.2-13.

Those wetlands that are inundated for only several months are termed ephemeral wetlands. Figure 4.2-20 shows the locations of the proposed reclaimed isolated wetlands at the Ona site. A typical planting list for reclamation of an ephemeral marsh is presented in Table 4.2-14.

Wet Prairies

Following mining, 406.6 acres of mined lands would be reclaimed as wet prairie (FLUCFCS 643). When combined with undisturbed wet prairies (66.1 acres), the post-reclamation total (472.8 acres) represents an increase of 132.8 acres (28 percent) compared to the pre-mining acreage. As shown on Figure 4.2-3, most of the wet prairie areas currently existing on-site occur on the landward fringe around other types of wetlands and wet pastures.

Factors that present challenges to the reclamation of wet prairies are hydroperiod, water quality, soils, and fire. Hydroperiod is the most important physical factor controlling the development of wet prairies. Wet prairie is the least frequently flooded of any Florida marsh type. Typical free-standing wet prairies in central Florida are isolated, shallow depressions that occur on marl or sandy soils that are flooded 50 to 150 days per year. Water is supplied to the prairies primarily by runoff from adjacent uplands and typically does not exceed two feet in depth. Therefore, ground elevations are critical to achieving the desired hydroperiod. In addition, wet prairie vegetation is adapted to oligotrophic (low nutrient) conditions.

Wet prairies would be reclaimed at the Ona site by grading to appropriate contours, planting with suitable vegetation and maintenance against invasion by noxious vegetation. The initial step in wet prairie reclamation would be to grade an appropriate site to suitable contours. The goal is to achieve two to five months of flooding with a maximum depth of two feet. Gentle slopes, no steeper than 10H:1V, are necessary for proper vegetation development. A typical cross-section of a reclaimed wet prairie is presented in Figure 4.2-21. In the post-reclamation landscape where wet prairies are proposed as fringe areas adjacent to other created wetlands, a continuous gentle slope from the upland to wetland would be provided. In free-standing wet prairie areas, undulations of one foot from the design elevation would be contoured to provide a wide enough range in elevation to generate an acceptable post-reclamation hydroperiod. This latter approach would also be used in wet palmetto prairie and pine flatwoods reclaimed communities to facilitate development of pineland swales. Use of temporary interim cover crops may be proposed to ensure that the appropriate hydroperiod has been established before planting the final proposed vegetation.

The sites would be planted with a mixture of appropriate species detailed in Table 4.2-15. Wet prairie reclamation techniques proposed by other phosphate companies include the addition of muck around the edges and only limited planting for the interior of the created wetland. If these techniques prove successful, IMC may adopt a similar approach and spread a layer of freshly harvested surface soil from existing prairies to provide additional seeds and increase plant diversity. This would be performed at sites where suitable soil can be found and the inoculation would coincide with mining.

In addition to removing unwanted vegetation, maintenance of the site may include burning at the start of the rainy season. Protection from vehicle traffic, excessive grazing by cattle, and hog rooting would be provided to the wet prairie sites until they have become established.

4.2.1.8 Product Transport

4.2.1.8.1 Rail (IMC's Proposed Action)

Product transport by rail would have minimal impact on vegetative communities at the Ona site. Impacts would be limited to the clearing of the rail corridor in unlikely event of a derailment resulting in damage to vegetation by the train or phosphate rock.

4.2.1.8.2 Truck transport

Impacts to vegetative communities arising from the use of trucks for product transport would be similar to the impacts described above for rail transport.

4.2.2 IMC's Original Area to be Mined Alternative

Impacts to vegetative communities arising from IMC's Original Area to be Mined Alternative would be similar to the Proposed Action Alternative with respect to clearing of native vegetation and subsequent reclamation of natural communities, except that under the Original Area to be Mined Alternative the area of impacted vegetation would be increased by 1,757 acres. With the exception of the floodplains of Horse and Brushy Creeks, the upland and wetland habitats selected to remain undisturbed under the Proposed Action Alternative would be cleared and mined, which would result in the loss of ecologically significant areas. Mined areas would be reclaimed as detailed in the Proposed Action Alternative, although the high quality wetlands and uplands proposed to remain undisturbed to function as corridors connecting reclaimed areas would be lost. Only the vegetative communities associated with the floodplains of Horse and Brushy Creeks would remain undisturbed under the Original Area to be Mined Alternative.

4.2.3 Natural Systems Group Recommended Areas of Conservation Interest

The impacts to vegetative communities under the Natural Systems Group Recommended Areas of Conservation Interest Alternative would be similar to the Proposed Action Alternative. The total acreage of mined lands would be 12,969 acres, a reduction of 2,867 acres compared to the Proposed Action Alternative. These 2,867 acres include areas that the applicant did not consider to be unique or significant vegetative habitats that should be preserved.

4.2.4 No USACE Jurisdictional Wetlands Impacts Alternative

To avoid any impacts to USACE wetlands, no stream crossings could occur, therefore only those areas that can be accessed by draglines currently in operation at the Fort Green Mine would be mined. This alternative would allow mining of approximately 1,122 acres of uplands on the western side of Horse Creek (5 percent of the total acreage).

The No Wetlands Impacts Alternative would result in no mining impacts to 5,378.3 acres of wetlands and 14,221.1 acres of uplands that cannot be accessed without crossing streams. These areas include several of the ecologically significant habitats at the Ona site. Vegetative impacts would be reduced to the loss of 1,122 acres consisting primarily of improved pasture, palmetto prairie, and mixed hardwood-conifer communities.

However, it is incorrect to assume that the No Wetlands Impacts Alternative would result in the unmined portion of the Ona site remaining undeveloped. The Hardee County Comprehensive Plan calls for a majority of the Ona site to be utilized for agricultural activities, which could result in the clearing of native vegetation from the site, with no requirements for mitigation other than any impacted jurisdictional wetland areas. Other potential development of the site includes rural residential, which is already apparent to the west of the site along SR 64.

4.2.5 No Action Alternative

The No Action Alternative would allow the Ona site to be developed to other land uses. It is incorrect to assume that the No Action Alternative would result in the preservation of existing vegetative communities. It is likely that the site would support agricultural uses, which would require clearing of native communities and would not require reclamation. Therefore, the impact to natural areas from agricultural uses would be permanent, rather than a temporary impact as in the case of the proposed action. The Hardee County Comprehensive Plan calls for a majority of the Ona site to be utilized for agricultural activities. The Ona site is within a 30–45 minutes drive of the urban part of the west coast of central Florida, and the development pressure for conversion of agricultural land to rural residential (5-20 acre ranchettes) is evident a few miles to the west along SR 64. The proposed project site could be susceptible to this same development pressure.

Furthermore, this type of development would have a significant impact on the existing vegetation, as is currently evident in Manatee County at the western boundary of the Ona site. Development of the Ona site to support agricultural and residential uses would reduce the probability of permanent preservation of critical areas and natural corridors through conservation easements or CARL purchases. Under the agricultural and residential land use scenario, additional NEBs would not be realized, such as the creation of lakes.

4.3 FISH AND WILDLIFE RESOURCES

4.3.1 Proposed Action Alternative

4.3.1.1 Mining Methods

4.3.1.1.1 Dragline Mining (IMC's Proposed Action)

A. Wildlife

The Ona site currently harbors a wildlife population that is representative of pasture and native rangeland, forests, and wetlands in west-central Florida. Mining at the Ona site would displace wildlife from the approximately 8,000 acres of native habitat and 7,800 acres of pasture that are proposed to be disturbed. The displacement would occur gradually over the estimated life of the mine (24 years). During this period, mobile species such as avifauna and large mammals would relocate to adjacent habitat without assistance. Less mobile species such as gopher tortoises and commensals would be relocated prior to land disturbance in accordance with the mine-wide wildlife and habitat management plan that provides species-specific management techniques. Aquatic species inhabiting wetlands would be lost during clearing, but it is believed that sufficient acreage of undisturbed wetlands coupled with the habitat in the mine water system and wetland reclamation would ensure the continuing existence of the aquatic biological community.

Figures 4.2-5 through 4.2-11 illustrate that the mining sequence is orderly and provides for off-site migration onto adjoining suitable habitat to the west, north, and south of the Ona site. Because land clearing would occur at a rate of about a section of land annually, these natural dispersal patterns would allow wildlife to relocate onto either undisturbed areas on-site or to adjoining properties.

IMC does not intend to force wildlife onto recently reclaimed areas through the pre-clearing survey process. All of the wildlife that would inhabit newly created habitat on IMC-mined land would be volunteer species. Only after reclaimed areas become established would species such as Eastern indigo snakes and/or gopher tortoises be relocated onto such lands.

Wading Birds

One known rookery located north of SR 64 in Section 19, Township 34 South, Range 24 East is scheduled for mining. This 34.3-acre shrub marsh dominated by Carolina willow would not be mined until approximately the year 2010 or after. It is not certain whether this wading bird colony would be present on-site at that future time. However, no wading bird rookery would be disturbed during nesting. All other existing rookeries are located in areas to remain undisturbed. All active nests would be avoided until after the young have fledged. Shrub swamps are particularly important for wading birds as nesting and foraging habitats. Pre-clearing surveys would be conducted to prevent disturbance of nesting activities.

New rookery habitat would be created throughout the Ona site during reclamation. Shrub swamps (FLUCFCS code 646) with deep water and shallow shrub areas would be intended for wading bird usage. Surrounding shrub "islands" with deepwater habitat encourages colonization by American alligators, which reduce the predation of wading bird eggs, nestlings, and fledglings by raccoons and other small mammals. In addition, forested islands in lakes are designed for rookeries.

<u>Aquatic Biota</u>

The proposed action involves the clearing of approximately 2,671 acres of aquatic habitat including forested and herbaceous wetlands, man-made ditches, cattle ponds, and a small amount of natural streams. Potential impacts to aquatic biota resulting from the proposed action include loss of wetland habitat, alteration of stream flow and discharge, and increased turbidity.

Motile inhabitants of wetlands with hydrologic connection to undisturbed aquatic habitats would be able to relocate and avoid impact. Those components of the aquatic community that are unable to relocate such as some species of benthic macroinvertebrates would be lost during mining. However, benthic macroinvertebrates, which are dominated by the larvae of terrestrial insects, would become established in reclaimed aquatic habitats through natural dispersal as adult insects deposit their eggs.

Reduction in peak stream flows in areas adjacent to active mining sites may reduce the amount of habitat available for fish and invertebrates. Peak stream flows inundate areas of the floodplain that typically are above the stream surface, which then provide a source of insects and organic matter that may be utilized by fish and invertebrates. However, measures to prevent the reduction of stream flow would be incorporated into the pre-mining land clearing activities. These include avoidance of the majority of the 25-year floodplains of all on-site streams with the exception of the previously ditched and agriculturally-impacted Oak Creek, and the construction of ditch and berm systems to maintain groundwater and surface water elevations. Access corridors would be constructed across Brushy Creek and the West Fork of Horse Creek during the active mining period. Once mining in the area is complete, these access corridors would be reclaimed to pre-mining vegetative communities. Culverts would be installed to maintain stream hydrology at access corridor locations.

4.3.1.2 Matrix Transport

4.3.1.2.1 Slurry Matrix Transport (IMC's Proposed Action)

No impacts to fish and wildlife resources are expected due to the transport of slurry matrix during the life of the Ona mine. The slurry matrix transport pipelines would be located within the ditch and berm systems. Therefore in the unlikely event of pipeline rupture the turbid slurry matrix would be contained. No discharge to natural aquatic habitats would occur.

4.3.1.2.2 Conveyor Transport

Impacts to fish and wildlife resources resulting from the construction of a conveyor system for matrix transport would be identical to the impacts of the proposed action, slurry matrix transport. Impacts would be limited to initial land clearing during construction of the conveyor system. As with the slurry matrix transport, the conveyor transport system would be located within the ditch and berm area, therefore any accidental spill would be contained.

4.3.1.3 Matrix Processing

4.3.1.3.1 Conventional Beneficiation (IMC's Proposed Action)

No impacts to fish and wildlife resources should arise from the proposed action of conventional beneficiation.

4.3.1.4 Plant Siting

4.3.1.4.1 IMC's Proposed Plant Location

The plant would be located on approximately 150 acres of land predominantly supporting pasture, live oak, freshwater marsh, and shrub marsh. Wildlife would be impacted by the loss of these habitats, although similar habitat would exist on-site throughout the lifetime of the mine, therefore the impact should be minimal. Pre-clearing surveys prior to construction would be utilized to ensure that impacts to wildlife are avoided.

Neo-tropical migratory birds may be negatively impacted by continuously illuminated facilities associated with the beneficiation plant constructed at the Ona site. These species prefer to migrate along dark corridors. The Fort Green beneficiation plant, located approximately 15 miles to the north-northwest of the proposed Ona beneficiation plant, has been in operation since the 1970s, and would be used for the Ona Mine during the first few years of mining. The newly constructed Ona beneficiation plant would replace the

DRAFT

Fort Green plant. Therefore, the amount of continuous illumination would be equal to the current conditions that neotropical migratory birds are accustomed to in the area.

4.3.1.4.2 Other Plant Locations

Alternate Site #1 is situated immediately adjacent to a high-quality mixed wetland hardwood forest contained within Conservation Area #9, which provides habitat for fish and wildlife resources. Construction and operation of the beneficiation plant adjacent to this area may adversely impact the existing habitat for wildlife as well as listed plant species.

Alternate Site #2 located within Conservation Area #11 contains high quality forested wetlands and palmetto rangeland surrounded by contiguous natural plant communities. Site #2 contains additional habitats outside of Conservation Area #11 that would be left undisturbed including shrub marsh, live oak, freshwater marsh, and temperate hardwood communities. Construction of the beneficiation plant at this site would result in the loss of potential habitat for wildlife.

4.3.1.5 Water Management

4.3.1.5.1 Process Water Sources

During mining, rainfall runoff from active mining areas would be captured for use in the beneficiation and mining processes. Surface water capture would reduce the size of a given stream's watershed, but the impact is not permanent and results in significantly reduced groundwater and/or surface water withdrawals. Surface water capture is not expected to adversely affect native fish and wildlife resources, as the perimeter ditch and berm system would maintain stream hydroperiod during mining and prevent turbid water from reaching streams which could adversely impact aquatic biota. The impact of groundwater withdrawals is limited to drawdown in the FAS.

4.3.1.5.2 Discharge to Surface Water

No impacts to fish and wildlife resources are expected as a result of discharge of wastewaters. Discharges from the clay settling areas are through permitted NPDES outfalls, which are monitored regularly and meet State of Florida surface water quality criteria. The State of Florida Class III Surface Water Quality Criteria were designed to promote recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife (62-302.530, F.A.C., 1996). Additionally, NPDES permitting requires acute and chronic toxicity tests of discharges to further ensure that no adverse impacts to aquatic biota in receiving waters would occur.

4.3.1.6 Sand and Clay Residuals Management

4.3.1.6.1 Conventional Settling (IMC's Proposed Action)

Conventional clay settling ponds would have no adverse impacts to fish and wildlife resources at the Ona site except in the unlikely event of dam failure resulting in the release of turbid waters to natural areas. A release from clay settling areas to natural aquatic habitats would impact the resident biota through clogging of gills, physical covering of benthic substrate, reduction in light penetration, and oxygen deprivation. These impacts are to be avoided through rigorous dam design, construction, and operation inspections. Dams are inspected regularly by IMC personnel at various levels and monitored with piezometers to warn of any change in internal pressure, which could indicate a developing problem. During the active mining period, the clay settling ponds would provide aquatic habitat for fish and wildlife resources of the site. In particular, wading birds are known to utilize clay settling ponds during the lifetime of the mine.

4.3.1.7 Reclamation

4.3.1.7.1 Conventional (IMC's Proposed Action)

A. Wildlife and Habitat Management Plan

The wildlife and habitat management plan is considered the conceptual framework for the maintenance of habitat during mining and following reclamation. Based upon this framework, precise area-specific plans would be developed in advance of clearing particular portions of the site for mining. This approach is preferable due to the estimated 30-year mine and reclamation period and 15,836 acres involved in the development of the Ona Mine, during which time the mining plans could change. Thus, while IMC cannot provide specific details of every component of the wildlife and a habitat plan for every year and acre of land involved, the following paragraphs define the specific commitments.

The goals and objectives are to minimize the loss of wildlife and wildlife habitat during the mining phase, and to create suitable wildlife habitat through the land reclamation process. Listed species present on areas to be cleared would be relocated to other suitable habitat in accordance with approvals granted by the USFWS and/or the FFWCC. In this context, the success of the management plan would be the maintenance of viable populations of wildlife in the Hardee County region.

Wildlife surveys would be conducted in advance of clearing each area of suitable habitat. Surveys would be conducted during appropriate seasons and times using qualified personnel throughout each phase of mining (i.e., prior to clearing each of the mining "blocks"). The area-specific pre-clearing surveys would be designed and conducted according to the habitat present within each mining block (e.g., mining areas that are pasture and devoid of pine trees would not be surveyed for RCWs but would be surveyed for burrowing owls and other species known to be present in improved pasture areas). No disturbance of any area would occur prior to conducting a pre-clearing survey using trained wildlife biologists. If species requiring management steps or relocation were observed, species-specific protocols would be used to complete the relocations. All wildlife management efforts would be coordinated with the USFWS and/or the FFWCC.

Mobile species displacement would likewise be planned on an area-specific basis. For example, clearing during the early years of mining would attempt to herd the mobile species toward the Horse Creek floodplain to allow dispersal to the north and south. Locally, species are expected to move to one of several “no-mine areas of conservation interest” on the property, and over time, to migrate onto suitable reclaimed habitat. Adjacent areas for recolonization exist to the north, west, and south of the Ona site. In particular, the IMC Fort Green Southern Reserves site to the north along the Horse Creek floodplain is currently being reclaimed such that the proposed habitat could harbor species from the Ona site.

The prime protection for birds would be to protect their nesting areas or to restrict clearing activities to the non-nesting season for listed species. Many of these species typically nest in wetlands, most notably listed species of wading birds, and significant areas of wetland habitat would be left undisturbed. Active nesting areas would not be disturbed until the young have fledged and mining activities would be rescheduled accordingly. The increase in open water areas used in the active mining and reclamation activities would increase the feeding habitat for aquatic birds and animals, as many avian species frequent active mining areas for feeding. The reclamation plan would provide for larger areas of wetlands that would provide nesting and foraging habitat for wetland dependent species.

Upon implementation of the reclamation plan, native habitat suitable for wildlife would total over 13,000 acres, or over half of the property. The natural systems would be positioned along the north-south corridors of the riverine systems as recommended by FFWCC permitting team members and as recommended in several regional ecological models such as the Integrated Habitat Network. Linkages connecting the Horse, Brushy, and Oak Creek core corridors would also be provided. Development of a single contiguous parcel of upland and wetland natural systems, to the extent possible given highway crossings and land ownership constraints, is projected to provide an improvement in the mine-wide habitat potential as compared to a patchwork quilt style approach.

FIPR has funded research on the factors influencing the wildlife utilization of reclaimed land, which identified several recommendations that have been incorporated into the planning and conceptual design of the proposed project’s reclamation plan:

1. Habitat reclamation should be larger integrated systems as opposed to smaller isolated communities.

2. Habitat areas should not be isolated from potential donor or migration sites. This is most important for the less mobile of the small vertebrates.
3. Reclamation designs should emphasize a broad regional approach that includes conservation and reclamation areas to promote the restoration and subsequent maintenance of a regional vertebrate species pool for recolonization.
4. Information on techniques and the results of the implementation of new methodology should be shared among the groups actively involved in natural systems rehabilitation.
5. Upland reclamation areas should have a diversity of plants, a well-developed middle-canopy layer, woody vegetation near ground level, a well-developed litter layer and a relatively even distribution of foliage among all canopy layers.
6. Soil texture, compaction and microflora and microfauna, should be similar to the targeted vegetation community. Topsoiling can provide an inoculum of desirable organisms and soil chemistry to the reclamation site.
7. Recognition that some communities would require the process of succession to achieve the desired end result, and nurse species or revegetation efforts spaced over a period of years may be the best way to influence the ultimate climax community.

IMC has not traditionally restocked reclaimed natural habitat except as needed to relocate species displaced by mining activities in other areas. Wildlife tends to re-populate reclaimed areas without human intervention and similar patterns are expected to occur at the Ona site.

IMC has committed to fund research concerning the need and techniques for restocking or relocating amphibians and burrowing owls. These proposals, as described in NEBs #13 and 14, would advance the state-of-the-art in reclamation research when completed (see Appendix F). If research in the field identifies cost-effective measures to provide for improved species protection through restocking efforts, IMC may employ such measures.

The research community is currently divided over the re-establishment of wildlife populations on reclaimed lands. Although current research indicated a lesser diversity on some reclaimed uplands when compared to unmined uplands, it is not expected that the post-reclamation landscape would be devoid of wildlife populations. This conclusion is based on several factors: 1) the extensive involvement of federal and state wildlife experts during the team permitting process to assist in the establishment of the "no-mine areas of conservation easement," 2) limiting the disturbance to approximately three-quarters of the property that is isolated or of lower quality habitat, 3) designing post-reclamation habitat that is positioned to maximize its effectiveness, and 4) confidence that the ongoing FIPR-funded research would identify methods to optimize the wildlife suitability of lands targeted for this purpose.

4.3.1.8 Product Transport

4.3.1.8.1 Rail (IMC's Proposed Action)

Product transport by rail is not expected to adversely impact fish and wildlife resources at the Ona site. The only impact anticipated is the infrequent occurrence of mortality due to collision of terrestrial wildlife with oncoming trains.

4.3.1.8.2 Truck transport

Truck transport would not be expected to adversely affect fish and wildlife resources at the Ona site. As with rail transport, the only impacts anticipated are the infrequent occurrence of road kill mortality to terrestrial wildlife.

4.3.2 IMC's Original Area to be Mined Alternative

Under IMC's Original Area to be Mined Alternative, all areas would be mined with the exception of the floodplains of Horse and Brushy Creeks. Impacts to fish and wildlife resources would be more significant when compared to the Proposed Action, due to the loss of an additional 1,757 acres of natural areas. The additional acreage includes significant habitat for fish and wildlife resources, which are proposed for preservation under the Proposed Action Alternative. The mining of these areas would reduce the habitat available for relocation of fish and wildlife resources during mining, as well as reduce the capability of fish and wildlife resources to naturally repopulate the area following reclamation.

4.3.3 Natural Systems Group Recommended Areas of Conservation Interest

Impacts to fish and wildlife resources would be similar to the Proposed Action Alternative, although the total acreage of disturbance would be reduced by 2,867 acres. Fish and wildlife resources would be displaced during clearing and mining of 12,969 acres of the Ona site. The preservation of additional acreage would increase the habitat available for fish and wildlife to relocate during mining, and would provide a greater amount of habitat to support recolonization of reclaimed lands. However, the most ecologically significant habitats are proposed for preservation under the Proposed Action Alternative, whereas the recommended areas of conservation interest include additional lands that were not considered by the applicant to be unique or critical habitats for fish and wildlife resources. As the majority of mined lands are to be returned to natural habitats, and the most ecologically significant habitats are to remain undisturbed, the impact to fish and wildlife resources is considered temporary. The Natural Systems Group Recommended Areas of Conservation Interest Alternative is not considered essential to reducing the impact to fish and wildlife resources.

4.3.4 No USACE Jurisdictional Wetlands Impacts Alternative

To avoid any impacts to USACE wetlands, no stream crossings would occur, therefore only those areas that can be accessed by draglines currently in operation at the Fort Green Mine would be mined. If the Section 404 Dredge and Fill Permit Application submitted to the USACE is denied, the state and county permits may be modified to allow mining of approximately 1,122 acres of uplands on the western side of Horse Creek (five percent of the total acreage).

The No USACE Jurisdictional Wetlands Impacts Alternative would result in no mining disturbance of 5,378.3 acres of wetlands, and 14,221.1 acres of uplands that cannot be accessed without crossing streams. These areas include several ecologically significant areas at the Ona site that provide fish and wildlife habitat. Avoidance of these areas would allow the existing populations of fish and wildlife to remain undisturbed, although the long-term protection of fish and wildlife cannot be assured. Much of the Ona site would likely become utilized for agriculture resulting in loss of fish and wildlife habitat. The Hardee County Comprehensive Plan calls for a majority of the Ona site to be utilized for agricultural activities, which would not require reclamation for the loss of fish and wildlife habitat. In addition, the Ona site is relatively close to the urban west coast of central Florida, and the development pressure for conversion of agricultural land to rural residential (5-20 acre ranchettes) is evident a few miles to the west of the site along SR 64. The proposed project site could be susceptible to this same development pressure.

4.3.5 No Action Alternative

The No Action Alternative would allow the natural habitats occurring at the Ona site to be altered for other land uses. It is incorrect to assume that the No Action Alternative would result in the preservation of existing fish and wildlife resources on-site. It is likely that the site would support agricultural and residential uses, which would require clearing of native communities, loss of habitat, and would not require reclamation. Therefore, the impact to fish and wildlife resources from agricultural and residential uses would be permanent, rather than a temporary impact as in the case of the proposed action. Development of the Ona site to support agricultural and residential uses would reduce the probability of permanent preservation of wildlife corridors through conservation easements or CARL purchases. Additionally, under the agricultural and residential land use scenario, no additional Net Ecological Benefits would be realized, such as the creation of lakes to provide fish and wildlife habitat.

DRAFT

4.4 THREATENED AND ENDANGERED SPECIES

4.4.1 Proposed Action Alternative

4.4.1.1 Mining Methods

4.4.1.1.1 Dragline Mining (IMC's Proposed Action)

The Proposed Action Alternative would result in the clearing and subsequent reclamation of approximately 15,836 acres at the Ona site. Land clearing activities in preparation for mining would impact native vegetative communities and disperse wildlife to adjacent habitats. Impacts to federal and state listed threatened and endangered plants and animals are expected to be temporary in nature, as reclamation and mining activities would coincide, and sufficient acreage of undisturbed or reclaimed habitat would be available for dispersal. Mobile species of threatened and endangered wildlife species would relocate to undisturbed areas of the property during land clearing, while less mobile listed species such as gopher tortoise and their commensals would be captured and relocated. Similarly, listed species of plants may be lost during land clearing although attempts would be made to avoid the incidental taking of listed plants by allowing third parties to locate and remove listed plants prior to mining. Additionally, seeds of listed plant species may be relocated to reclaimed areas through the application of topsoil from areas to be mined, as well as through natural seed dispersal from undisturbed areas. Efforts to avoid impacts to threatened and endangered plant and animal species would include pre-clearing surveys, collection, and subsequent relocation to undisturbed or reclaimed habitats on- or off-site.

Discussion of threatened and endangered plant and animal species surveys and results are found in Section 3.4. A summary of potential impacts to state and federally-listed plants and animals observed on-site is found in Table 4.4-1. The following sections provide descriptions of the general setting relative to listed plant and animal species, a description of the measures that would be taken to protect listed species, and descriptions of those plant and animal species observed or potentially at the Ona site.

A. Plants

General Impacts

No federally-listed plant species were observed at the Ona site.

Nine state-listed species have been observed on the site, eight of which occur in areas proposed for mining. Land clearing activities in preparation for mining would result in the clearing of certain of these listed plant species individuals. Eight state listed plant species occur in habitats proposed for mining including nodding pinweed (*Lechea cernua*), wild coco or giant orchid (*Pteroglossapsis ecristata*), leafless beaked orchid (*Stenorrhynchos lanceolatus*), Florida butterfly orchid (*Encyclia tampensis*), cinnamon fern (*Osmunda* *cinnamomea*), royal fern (*Osmunda regalis*), cardinal air plant (*Tillandsia fasciculata*), and giant air plant (*Tillandsia utriculata*). One listed species, Catesby's lily (*Lilium catesbair*), was discovered in the pine flatwoods habitat within the no-mine Conservation Area #6. This lily would not be affected by mining activities.

<u>Pre-Clearing Relocation Methodology</u>

Prior to land clearing, listed plant species may be transplanted to preserved or reclaimed areas on- or off-site. The relocation of threatened and endangered plant species is detailed in NEB #10. It is anticipated that the reclaimed Brushy Creek floodplain may be a major transplant recipient area. IMC would allow third-party entities that meet the conditions outlined in the NEB, to recover populations of state-listed plants and relocate them on-site or off-site.

Three of the state-listed plant species, nodding pinweed (*Lechea cernua*), wild coco or giant orchid (*Pteroglossapsis ecristata*), and leafless beaked orchid (*Stenorrhynchos lanceolatus*), are annuals and only identifiable during certain seasons. Therefore, relocation of topsoil containing seed and plant material would probably become the primary mechanism for moving these listed plants noted on the site. However, some of the state-listed plant species at the Ona site can be easily recognized at any time of the year and are more easily relocated by direct transplanting. These state-listed plant species are the Florida butterfly orchid (*Encyclia tampensis*), cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), cardinal air plant (*Tillandsia fasciculata*), and giant air plant (*Tillandsia utriculata*). IMC may directly transplant the listed ferns and bromeliads in reclamation and/or conservation areas, as appropriate. Otherwise, IMC would notify pre-qualified/pre-registered third parties and allow them the opportunity to collect and relocate listed plants during the wildlife pre-clearing surveys.

Regarding nodding pinweed (*Lechea cernua*), wild coco or giant orchid (*Pteroglossapsis ecristata*), and leafless beaked orchid (*Stenorrhynchos lanceolatus*), little is known about their autocology (environmental effects on growth) and transplant possibilities for success. Orchid hobbyists indicate that leafless beaked orchids transplant well, but the giant orchid does not. Again, where practical, IMC would allow third parties to attempt to transplant these terrestrial orchids. It should be noted that both orchids are more often encountered in ruderal habitats. IMC has documented at least one instance where the giant orchid was transplanted along with topsoil relocation and several of the plants have re-established themselves on reclaimed lands at the West Noralyn reclamation site. Likewise, nodding pinweed is naturally reproducing at the West Noralyn site.

Potential impacts to specific listed plant species that were observed on-site are discussed below. In addition, relocation methods for the Nodding Pinweed are also described.

Nodding Pinweed (Lechea cernua), State Threatened

Nodding pinweed is known to occur at two locations at the Ona site. One population is in Conservation Area #2, located at the southwestern corner of the Ona site (Section 31, Township 34 South, Range 23 East). The other location for this population is in the xeric area known as "the boneyard" (Section 16, Township 34 South, Range 23 East), which is proposed for mining. Clearing of the boneyard would result in the loss of this population. IMC would attempt to relocate nodding pinweed in one or a combination of the following methods:

1. Topsoil may be removed from areas of Section 16, Township 34 South, Range 23 East containing nodding pinweed and placed at one or more of the scrub reclamation areas within the Ona site or at other IMC properties.
2. Individual plants may be excavated and relocated to appropriate areas within the Ona site that are not to be disturbed such as the xeric community in Section 31, Township 34 South, Range 23 East, or the scrub located in the northern portion of Section 27, within the no-mine Conservation Area #6.
3. IMC plans to investigate seed collecting methodology to retrieve the nodding pinweed's small seeds scattered between areas of scrub canopy. Seeds collected would be used in one or more of the following methods: 1) To seed scrub areas located in undisturbed areas (Sections 31 and 27) or other suitable areas within the Ona site; 2) to seed scrub reclamation projects located on other IMC properties; and/or 3) to grow nursery stock for future planting.

Wild Coco (Pteroglossapsis ecristata), State Threatened

Wild coco is often found in disturbed xeric communities, on spoil, and in well-drained prairies. This orchid is present throughout most of peninsular Florida and typically blooms in the summer and early fall. A population of wild coco was observed at the Ona site east of Horse Creek in a pasture adjacent to an unpaved trail in Section 19, Township 34 South, Range 23 East. This area is proposed for mining; therefore, this population of wild coco would be lost during land clearing unless transplanted.

Leafless Beaked Orchid (Stenorrhynchos lanceolatus), State Threatened

Leafless beaked orchids grow in open pastures, roadsides, oak hammocks, wet pine flatwoods, and on sandhills throughout most of Florida. Blooming occurs during the months of April through July. Only one small population consisting of a few individuals was observed at the Ona site. These individuals were found along the roadside at the edge of a xeric oak community located in the northwestern corner of the site in Section 9, Township 24 South, Range 23 East. This area is proposed for mining; therefore, individuals of leafless beaked orchid would be lost during land clearing unless transplanted.

DRAFT

Florida Butterfly Orchid (Encyclia tampensis), State Commercially Exploited

Florida butterfly orchid primarily occurs in the swamp and oak hammock forests within the 25-year floodplains of Horse and Brushy Creeks, which would not be significantly disturbed. The loss of individuals in swamp and oak hammock forests to be mined would not jeopardize the continuing existence of the Florida butterfly orchid located on-site.

Cinnamon Fern (Osmunda cinnamomea), State Commercially Exploited

Cinnamon fern is common at the Ona site, especially within the swamp forests and oak hammocks located within the 25-year floodplains of Horse and Brushy Creeks, which would not be significantly disturbed. Populations located within areas to be mined would be lost, but healthy populations of cinnamon fern would remain after completion of mining and reclamation.

Royal Fern (Osmunda regalis), State Commercially Exploited

As the case with cinnamon fern, royal fern is common at the Ona site, especially within the swamp forests and oak hammocks within the 25-year floodplains of Horse and Brushy Creeks. These floodplains are not proposed for mining, and therefore, individuals of royal fern within the floodplains would not be significantly disturbed. Individuals within areas proposed for mining would be lost, but healthy populations of royal fern would remain after completion of mining and reclamation.

Cardinal Air Plant (Tillandsia fasciculata), State Endangered and Giant Air Plant (Tillandsia utriculata), State Endangered

The cardinal air plant and giant air plant are found primarily within the 25-year floodplains at the Ona site. Although common at the Ona site and throughout much of peninsular Florida, both *T. fasciculata* and *T. utriculata* are state listed as endangered due to the introduction of the Mexican weevil, *Metamasius callizona*, into southeast Florida. Larvae of the Mexican weevil burrow into the base of air plants resulting in localized extirpations. Presently, populations of *T. fasciculata* and *T. utriculata* at the Ona site do not appear to be infested with the Mexican weevil.

The majority of habitat supporting these air plants is not proposed to be mined, therefore the loss of a few individuals would not jeopardize the continuing existence of this species on-site following mining and reclamation.

B. Wildlife

General Impacts

Land clearing, mining, and reclamation activities are expected to disturb federal- and state-listed threatened and endangered wildlife species at the Ona site. Impacts would include loss of habitat, displacement to unmined habitats, and loss of those individuals unable to be relocated. However, efforts would be undertaken to prevent any incidental take of listed wildlife species during the life of the mine. Mobile species would relocate to undisturbed areas of the property during land clearing, while less-mobile species such as gopher tortoises and their commensals would be captured and relocated. The dispersal of mobile wildlife from an area to be cleared for mining is similar to the dispersal that occurs when a controlled burn is conducted. Controlled burns are routinely conducted on and near the Ona site, therefore the wildlife population has adapted to large tracts of habitat being unavailable during fire recovery periods.

IMC has conducted spring, summer and fall seasonal wildlife surveys within the Ona site in an effort to document the presence and/or absence of listed species. A total of 2,200 trap-nights were completed to determine listed species presence and populations. Results are presented in Chapter 3, Affected Environment. IMC would use this information with land use type to further define pre-clearing survey methodology prior to disturbance. Pre-clearing surveys would be conducted in areas to be mined. The purpose of the surveys is to locate all wildlife individuals for management, capture, and release to undisturbed or reclaimed areas. These detailed pre-clearing surveys of the entire site (not just a percentage) would be conducted as per FFWCC Wildlife Survey Methodology Guidelines (1988) and FDEP procedures by habitat. The results would supplement and complement the presence and/or absence documentation completed to date.

Pre-Clearing Wildlife Survey Methodology

IMC's pre-clearing survey methodologies for wildlife species are based upon the: 1) habitat type that exists within a particular project boundary; 2) habitat type populated by the listed species during previous seasonal surveys; and, 3) species geographic range. Typical potential species identified within the Ona region include:

Burrowing owl	*Speotyto cunucularia*
Sherman's fox squirrel	*Sciurus niger shermani*
Florida mouse	*Podomys floridanus*
Florida black bear	*Ursus americanus floridanus*
Florida gopher frog	*Rana areolata aesopus*
Florida pine snake	*Pituophis melanoleucus mugitus*
Eastern indigo snake	*Drymarchon corais couperi*
Short-tailed snake	*Stilosoma extenuatum*
Sand skink	*Neoseps reynoldsi*
Gopher tortoise	*Gopherus polyphemus*
American alligator	*Alligator mississippiensis*
Florida sandhill crane	*Grus canadensis pratensis*
Florida scrub jay	*Aphelocoma coerulescens*
Red-cockaded woodpecker	*Picoides borealis*
Bald eagle	*Haliaeetus leucocephalus*

Southeastern American kestrel	*Falco sparverius paulus*
Limpkin	*Aramus guarauna*
Roseate spoonbill	*Ajaia ajaja*
Tri-colored heron	*Egretta tricolor*
Little blue heron	*Egretta caerulea*
Snowy egret	*Egretta thula*
White ibis	*Eudocimus albus*
Woodstork	*Mycteria americana*

Pre-clearing surveys for protected wildlife species are typically conducted six months prior to disturbance of a specific area to further evaluate the potential for occurrence or presence of protected species on-site. Additionally, each area proposed for mining is examined between one to three months prior to clearing in order to identify any species that may be nesting during the particular phase or season of the project. Vehicular and pedestrian transects are conducted throughout the project site. Pedestrian surveys are specifically conducted through individual habitats within the study area.

Surveys within upland habitats and improved pasture are typically accomplished by pedestrian transects and vehicular transects. Use of the vehicles allows greater coverage of each habitat when compared to pedestrian surveys alone. Upland habitat pedestrian transects surveys are typically spaced 50 feet apart; sometimes closer within dense gopher tortoise habitat.

Transects within the wetland areas are usually conducted randomly. In addition, surveys of the large marsh areas are sometimes conducted by using an aerial (helicopter) field assessment of the entire area.

Specific surveys for each species are conducted at various times of the day to coincide with normal activity patterns of wildlife species. Wildlife transects are conducted starting in the early morning and completed around dusk of each day. Gopher tortoise are generally more active during early morning and late afternoon hours; however, burrow sightings can be conducted during any portion of the day as sighting of the tortoise is not necessary to validate their presence on-site.

Certain species of wildlife are conspicuous and readily observed, however, the majority of species are inconspicuous and elusive. Any observations of wildlife species or their signs, which may include tracks, droppings, castings, nests, and skeletons, are typically mapped and recorded in field notes. A list of dominant vegetative species within each community is also recorded during all field surveys with more detailed lists compiled when protected species are located within a particular community to aid in the identification of protected species habitat.

IMC intends to provide reasonable and appropriate protection for listed species identified during wildlife and specific species surveys to ensure that populations are not eliminated from the Ona site.

Impacts to specific listed wildlife species that were observed on-site are discussed below. Additionally, pre-clearing survey techniques for each species are also described.

American Alligator, Federal Threatened Due to Similarity of Appearance, State Species of Special Concern

Impacts

Impacts to American alligators are expected to be positive based on experience from previous mining operations. Alligators are mobile and relocate to the mine water system and undisturbed aquatic habitats during land clearing and mining activities. There is sufficient mine water system and undisturbed or reclaimed habitat available during the lifetime of the mine to accommodate all resident alligators at the Ona site. The mine water system provides habitat for alligators, with good food supplies.

Pre-Clearing Survey Methods

Habitats proposed for mining that are suitable habitat for American alligators include open water, ditches, mixed hardwood wetlands, freshwater marsh, and shrub swamp. To avoid impacting alligators, a variation of directional clearing would be utilized in which water levels are lowered to encourage dispersal. Pre-mining dewatering can require more than 30 days in the case of deepwater wetlands. As water levels are lowered, alligators disperse to adjacent floodplains, lakes, ditches, or other wetland habitats. Historically, alligators have often relocated to the mine water systems, and no alligator mortality due to mining has been recorded.

Eastern Indigo Snake, Federal and State Threatened

Impacts

Although the indigo snake utilizes various habitats, they use gopher tortoise burrows more than other underground refugia to escape the cold and avoid desiccation. Most of the appropriate upland habitat at the Ona site contains gopher tortoise burrows. Clearing of habitats containing gopher tortoise burrows would directly impact the Eastern indigo snake through loss of habitat and possible entombment as burrows are collapsed. Suitable habitat containing gopher tortoise burrows is located within Conservation Area #6.

Other underground refugia used by this species include burrows of armadillos, cotton rats, and land crabs; natural ground holes; and, hollows at the base of trees or shrubs. These refugia are used most frequently when gopher tortoise burrows are not available, particularly in low-lying areas. Most of the low-lying areas at the Ona site would be associated with the floodplains of Horse Creek, Brushy Creek, Oak Creek, and Hickory Creek, and are proposed to remain undisturbed.

Pre-Clearing Survey Methods

IMC proposes to conduct pre-clearing surveys in any of the above-listed habitats that would be disturbed by mining activities. These surveys would occur no more than six months prior to mining disturbances in association with gopher tortoise surveys, and would additionally include mesic and unflooded hydric habitats. Surveyors would inspect all areas that may provide refugia for the indigo snake, as listed above. Likewise, during gopher tortoise excavations, any indigo snake that is encountered would be directed or relocated with the gopher tortoises onto either conservation areas or appropriate reclaimed habitat according to the USFWS approved BMP plan.

IMC has implemented an Eastern Indigo Snake Management Plan, developed in cooperation with the USFWS and FFWCC (see Appendix AI-12-B in IMC's CDA). Over the last several years in pre-mining surveys of over 20,000 acres, IMC has directed or relocated over 20 indigo snakes to either approved reclaimed gopher tortoise habitat and/or to conservation areas. One mortality reported to the USFWS and FFWCC occurred during cold weather when a snake crawled under an active dragline. However, no mortalities to date have occurred from mobile equipment, nor to indigo snakes relocated on IMC property in association with the Eastern Indigo Snake Management Plan. Based on this, IMC submits that management measures are sufficient and that the plan reasonably protects the on-site population of this species. Likewise, during gopher tortoise excavations, any indigo snake that is encountered would be directed or relocated with the gopher tortoises onto either conservation areas or appropriate reclaimed habitat.

Bald Eagle, Federal and State Threatened

Impacts

No direct impacts to bald eagles are anticipated with the exception of partial habitat loss, which would be mitigated through the creation of new habitat during reclamation. Bald eagles can relocate to adjacent habitat during pre-mining clearing operations. The increased lake area would provide new feeding habitat for bald eagles. Additionally, the mine water system provides foraging opportunities for the bald eagle.

Pre-Clearing Survey Methods

Bald eagles typically nest in large trees (often pine trees) near a lake or open body of water, which is utilized for foraging. Nesting sites are observed and recorded on aerial maps during pre-clearing surveys. No nesting sites have been observed at the Ona site during baseline wildlife surveys, however, if pre-clearing surveys reveal bald eagle nesting activity, the area would be protected, and a USFWS/FFWCC approved site management plan would be implemented (under current rules, the site would be protected from development as long as the nest site was active). During the past 20 years, IMC has mined adjacent to several active bald eagle nests without displacement of the birds. During these instances, IMC personnel have strictly followed FFWCC and USFWS guidance and applicable regulations.

Woodstork, Federal and State Endangered

Impacts

Woodstorks would be impacted through the loss of habitat as wetlands are cleared in preparation for mining. However, adjacent lands contain numerous wetlands suitable for foraging, which when combined with the undisturbed wetlands on-site, would continue to provide an adequate food supply during mining. In addition, the mine water system provides foraging opportunity for wading birds including woodstorks. Cypress swamps, hardwood swamps, and willow thickets are common nesting sites for woodstorks (Nesbitt et al, 1982). Loss of wetland habitat is considered temporary as reclamation plans include an increase in the acreage of both forested and non-forested wetlands.

Pre-Clearing Survey Methods

To avoid impacting woodstork nesting, pre-clearing pedestrian transect surveys would be conducted prior to clearing any forested wetlands. Woodstorks, limpkins, little blue herons, snowy egrets, white ibis, roseate spoonbills, and tri-colored herons are included in typical surveys. Any migratory winter species observed are also recorded. If pre-clearing surveys reveal active nesting, clearing activities would be restricted until the young have fledged and mining activities would be rescheduled accordingly. Clearing of any nests would require consultation with the USFWS and FFWCC, and a nest removal permit.

Florida Panther, Federal and State Endangered

Impacts

No individual Florida panthers were observed at the Ona site, although one track and a suspected observation were reported. Impacts to the Florida panther would include loss of potential habitat, although this impact may be mitigated by the preservation of wildlife corridors associated with conservation easements.

Pre-Clearing Survey Methods

No Florida panthers were observed on the Ona site, therefore no pre-clearing surveys are proposed. It should be noted, however, that any signs of Florida panther utilization of the site (direct observation, tracks, scat) would be observed during the performance of other pre-clearing surveys, since these surveys would be conducted in habitat that potentially could be used by the panther.

Arctic Peregrine Falcon, Federal List to Monitor, State Endangered

Impacts

The arctic peregrine falcon is a migratory species that utilizes open pasture habitats for foraging. While the mining and reclamation plans include a reduction in acreage of pasturelands, large areas of pasture occur in the region surrounding the Ona site; therefore, it is unlikely that mining activities would impact the arctic peregrine falcon.

Pre-Clearing Survey Methods

No pre-clearing surveys specifically targeting the arctic peregrine falcon are proposed, however, any observations would be noted during general pre-clearing surveys. Clearing of any nests would require consultation with the USFWS and the FFWCC, and a nest removal permit.

Red-Cockaded Woodpecker, Federal Threatened, State Endangered

Impacts

The RCW requires old growth pine stands for nesting. No RCW were observed at the Ona site. Therefore, it is unlikely that mining would adversely impact RCWs. However, secondary impacts may arise through the loss of potential habitat for future colonization. IMC has agreed to avoid disturbing any of the highest priority potential RCW habitat area identified by Dr. Bowman (Conservation Area #6). An additional 47 percent of the remaining potential RCW habitat at the Ona site would not be mined. Overall, 228 acres, or 79 percent, of the potential RCW habitat identified by Dr. Bowman at the Ona site would be avoided. In addition, IMC is proposing to enhance undisturbed pine flatwoods by planting longleaf pines on approximately 146 acres. Planting longleaf pines on these undisturbed areas would enhance the existing on-site habitat over time. Over time, this would improve the habitat available for colonization by RCWs. IMC is also committed to creating approximately 465 acres of pine flatwoods through the land reclamation process, which may supplement the undisturbed habitat as it matures. As these areas mature, they could become suitable habitat to supplement the existing undisturbed habitat.

Pre-Clearing Survey Methods

Optimum old growth pine forests, remnants of suitable habitat, and/or nest trees would be inspected during the course of upland species surveys. Surveys would be conducted using FFWCC recommended pedestrian transects in a diminishing quarters pattern to achieve nearly 100 percent visual coverage of the mature pine trees utilized by RCWs. Suitable habitat designated for mining would be re-surveyed prior to clearing. If pre-clearing surveys reveal active nesting, IMC would develop and implement FFWCC and USFWS approved management plans specific to the site. These plans would include, at a minimum, restricting clearing activities, rescheduling mining activities accordingly, and possible relocation.

Audubon's Crested Caracara, Federal and State Threatened

Impacts

No Audubon's crested caracaras (*Polyborus plancus audubonii*) were observed at the Ona site during field wildlife surveys. Since they were not observed at the site, no impacts are expected during land clearing and mining activities.

Pre-Clearing Survey Methods

Prior to clearing upland communities containing cabbage palms that could be used by caracaras for nesting, pedestrian and vehicular surveys would be conducted to determine if nests are present. If an active nest were observed, clearing operations in the vicinity of the nest would be scheduled outside of the caracara's nesting season. Clearing of any nests would require consultation with the USFWS and the FFWCC, and a nest removal permit. To encourage caracara nesting, IMC is proposing to transplant cabbage palms into reclaimed, open field areas (FLUCFCS 210 and 320) in order to create suitable caracara habitat.

Florida Scrub Jay, Federal and State Threatened

Impacts

The Florida scrub jay prefers large tracts of scrub habitat. However, small families have adapted to remnant xeric parcels due to the loss of suitable upland habitat. No scrub jays were observed at the Ona site. Therefore it is unlikely that mining activities would adversely impact scrub jays. A temporary loss of potential habitat would occur. However, upon completion of reclamation, the acreage of potential habitat would be similar to current conditions.

Pre-Clearing Survey Methods

No Florida scrub jays have been observed at the Ona site. The Florida scrub jay prefers large tracts of scrub habitat, although small families have adapted to remnant xeric parcels. Pre-clearing surveys for Florida scrub jay include callback tapes played in one-minute increments for 15 minutes along pedestrian transects that are typically 100-200 meters apart. Presence/absence is determined, and nesting areas and range of habitat is calculated if jays are observed. If pre-clearing surveys reveal active nesting, IMC would consult with the FFWCC and USFWS to develop and implement a site-specific management plan for scrub jay protection.

Southeastern American Kestrel, State Threatened

Impacts

Kestrels prefer pine flatwoods and xeric oak communities near open habitats such as pasture, old fields, or power line right of ways. Clearing of pine flatwoods and xeric oak communities would impact kestrels through loss of habitat and displacement. Significant acreage of suitable habitat would remain undisturbed during the life of the mine, and reclamation activities include large areas of pasture and pine flatwoods. Kestrels commonly use active mine areas for foraging. Therefore, impacts to the kestrel are expected to be minimal.

Pre-Clearing Survey Methods

Typical surveys for the southeastern American kestrel are conducted in open improved pasture areas and where snags are present. Nesting sites are observed and recorded on aerial maps. During the normal nesting season (between March and August), surveys focus on areas in and/or around potential isolated trees and/or snags. If pre-clearing surveys reveal southeastern American kestrel nesting sites, clearing activities would be restricted until the young have fledged Clearing of any nests would require consultation with the FFWCC and a nest removal permit.

Gopher Tortoise, State Species of Special Concern

Impacts

Gopher tortoises would be impacted through the direct loss of their preferred habitats; xeric, sandhill, and pine flatwood communities. While land clearing prior to mining would destroy gopher tortoise burrows, the loss of any individual gopher tortoise would be avoided using pre-clearing survey, capture, and relocation procedures, which are described in the following section.

Gopher Tortoise Pre-Clearing Survey Methods

Pre-clearing surveys for gopher tortoises are conducted in all suitable habitats described for this species in accordance with the FFWCC Wildlife Survey Methodology Guidelines (1988). Survey transects are established at approximately 50-foot intervals within targeted areas to ensure a predetermined established percentage of the surface area is covered. Typically, this range is a minimum 15 percent aerial coverage, and often up to 100 percent coverage is completed. All tortoise burrows within the transects are identified and assigned an activity class of “active”, “inactive” or “abandoned” pursuant to the FFWCC guidelines (1988). Transect lengths are determined *in situ* by the actual extent of gopher tortoise burrow occurrence, and are based on soil and habitat conditions. Tortoises located during pre-clearing surveys are captured and relocated to recipient sites prior to land clearing activities.

Gopher tortoise recipient sites go through a rigorous process of investigation and approval by FFWCC prior to relocation of gopher tortoises and commensal species to the site. Reclaimed recipient sites are generally at least three years old and have adequate vegetation to provide sufficient food sources such as acorns, insects, seeds, prickly pear cactus, paw paw, and small rodents for a variety of wildlife species such as gopher tortoises, indigo snakes, the Florida mouse, and scrub jays.

IMC currently has several recipient sites that are in excess of 1,500 acres and have been approved by the FFWCC. A few of these sites are shown in Figure 4.4-1. Based upon new policy guidelines published by the FFWCC (January 31, 2001), a density of three tortoises per acre is allowed, which gives IMC a total carrying capacity of over 4,500 tortoises. Therefore, excess carrying capacity of recipient sites is anticipated for gopher tortoise restocking in the future.

Follow-up surveys are conducted one year after the relocation to evaluate its relative success. Based on these surveys, IMC has found that re-population is occurring on recipient sites by the evidence of hatchlings.

Commensal Species Pre-Clearing Survey Methods

Four additional protected species with the potential to occur on-site are commonly associated with gopher tortoise burrows as commensal organisms. These are the Florida mouse, Florida gopher frog (an amphibian species), and two reptile species, the Florida pine snake and Eastern indigo snake. IMC has performed several relocation projects in which gopher tortoise, indigo snake, and the Florida mouse have been captured and relocated to approved recipient sites. Two additional protected species known to utilize gopher tortoise burrow aprons and gopher tortoise habitat types include the short tailed snake and the sand skink. As for the short tailed snake, Hardee County is not located within this species' geographic range. Similarly, although suitable habitat exists on-site, the reported range for the sand skink does not include Hardee County (Moler, 1992). Nevertheless, any sand skinks or short tailed snakes discovered during pre-clearing pit-trapping and/or drift fence surveys conducted for pine snakes and gopher frogs would be captured and relocated to suitable habitat.

Gopher Frog, State Species of Special Concern

Impacts

The Florida gopher frog is most frequently found in xeric, sandhill, and pineland communities in association with gopher tortoise burrows. The gopher frogs captured via pit trapping at the Ona site were found in sand live oak and hardwood/conifer mixed forest. Dragline mining of these habitats would directly impact gopher frogs through loss of habitat. As with the gopher tortoise and Florida mouse, extensive pre-clearing surveys, capture, and relocation procedures would be used to minimize the loss of individual gopher frogs prior to mining.

Pre-Clearing Survey Methods

The Florida gopher frog is frequently found in xeric, sandhill, and pineland communities in association with gopher tortoise burrows. The gopher frogs captured via pit trapping at the Ona site were found in sand live oak and hardwood/conifer mixed forest. Although randomly recorded call surveys were used for herpetofauna in areas of greater gopher tortoise populations, no gopher frog calls were heard in any of the surveyed areas. These call surveys were primarily recorded after rain events during the spring, summer, and fall of 1998, and their findings were presented in the CDA (IMC, 2002).

IMC proposes to conduct similar pit trapping and/or drift fence pre-clearing surveys in those areas of highest gopher tortoise burrow densities to sufficiently trap the population. These areas include the two habitats in which gopher frogs were previously captured, as well as, the sand live oak habitat located in Section 9 and another sand live oak habitat located in Section 27 (conservation area). These areas have the greatest gopher tortoise densities, and would provide the best habitat for gopher frogs.

Approximately 4,825 acres or 23 percent of the Ona site (12 percent uplands) would be left undisturbed. Conservation Areas #2 and #6 have been identified as desirable habitat for conservation for many different wildlife species. These areas contain many habitat communities, including those that are desirable to the gopher frog, and include xeric uplands, isolated wetlands, and cattle ponds. Captured gopher frogs would be relocated to these conservation areas in an effort to establish a population or supplement an existing population of gopher frogs. In the post-reclamation condition, approximately 3,268 acres of marsh wetlands are proposed to be created; many of which would be isolated ephemeral wetlands preferred by gopher frogs as indicated on Figure 4.2-20.

Burrowing Owl, State Species of Special Concern

Impacts

No burrowing owls were directly observed at the Ona site. However, three probable burrow areas were observed in pasturelands on the site. Similar to the arctic peregrine falcon, burrowing owls would be impacted through the loss of potential habitat. However, this impact would not be significant since there are large tracts of pastureland near the Ona site to serve as habitat for this species. Additionally, although the overall acreage of pasture would be reduced by 28 percent following reclamation, there would be 5,255.2 acres reclaimed as improved pasture, some of which may provide suitable habitat for burrowing owls.

Pre-Clearing Survey Methods

During wildlife surveys conducted at the Ona site, three areas containing burrows were observed as indicated on Figure 3.4-2. However, no owls were observed at the burrows. If pre-clearing surveys reveal the presence of burrowing owls, attempts would be made to relocate the individuals. Although Florida burrowing owls have not been relocated in the past, available research indicates that the western burrowing owl species (*Speotyto cunicularia*) has been successfully relocated. NEB 14, entitled Florida Burrowing Owl Relocation Project, outlines IMC's proposal to conduct or fund research to determine the success of burrowing owl relocation on reclaimed lands.

DRAFT

Florida Sandhill Crane, State Threatened

Impacts

The Florida sandhill crane typically nests within wetland marshes or wet prairies, and feeds in open prairies or pastures. These habitat types are prevalent at the Ona site, and would be available for use by sandhill cranes during the lifetime of the mine. This species prefers nesting in pickerelweed/maidencane marshes, which allows good visibility and helps prevent predation. Destruction of nests would be avoided through pre-clearing surveys. If during pre-clearing surveys an active nest was observed, clearing operations near the nest would be scheduled outside of the sandhill crane nesting season. The reclaimed wetlands would provide replacement nesting habitat, and reclaimed improved pastures would provide additional foraging habitat.

Pre-Clearing Survey Methods

Pre-clearing surveys for Florida sandhill cranes would be focused on potential nesting sites. The Florida sandhill crane typically nests within wetland marshes or wet prairies, and feeds in open prairies or pastures. This species' preferred nesting site is usually limited to pickerelweed/ maidencane marshes, which allow high visibility to avoid predation. Pre-clearing presence/ absence surveys are typically conducted by pedestrian transects, while larger marsh areas often require helicopter surveys in order to assess marsh nesting sites. If pre-clearing surveys reveal active nesting, clearing activities would be restricted until the young have fledged and mining activities would be rescheduled accordingly. Clearing of any active nests would require consultation with the FFWCC and a nest removal permit.

Little Blue Heron, White Ibis, Snowy Egret, and Tri-colored Heron, State Species of Special Concern

Impacts

Wading birds, including little blue heron, white ibis, snowy egret, and tri-colored heron would be impacted through the loss of habitat as wetlands are cleared in preparation for mining. However, adjacent lands contain numerous wetlands suitable for foraging and when combined with the undisturbed wetlands on-site, would continue to provide an adequate food supply during mining. In addition, the mine water system provides foraging opportunities for wading birds, especially in times of regional drought. Loss of wetland habitat is considered temporary, as reclamation plans include an increase in the acreage of suitable wetland habitat for wading birds. Prior to clearing, suitable nesting habitat (marshes and woody shrub wetlands) would be surveyed and should any active nests be located, clearing would be restricted during the nesting season.

Pre-Clearing Survey Methods

As described for the Woodstork, pre-clearing pedestrian transect surveys through wetlands would be conducted to identify nesting activity of wading birds. Limpkins, little blue herons, snowy egrets, white ibis, roseate spoonbills, tri-colored herons, as well as Woodstorks are included in typical surveys. Any migratory winter species observed are also recorded. If pre-clearing surveys reveal active nesting, clearing activities would be restricted until the young have fledged and mining activities would be rescheduled accordingly. Clearing of any active nests would require consultation with the FFWCC and a nest removal permit.

Sherman's Fox Squirrel, State Species of Special Concern

Impacts

Sherman's fox squirrels typically utilize mature forested upland systems. Therefore, upland hardwood hammocks proposed for mining would impact individual Sherman's fox squirrels. As they are highly mobile, it is expected that they would relocate to undisturbed areas with suitable habitat. Measures to prevent the incidental taking of any Sherman's fox squirrels include the directional clearing BMP.

Pre-Clearing Survey Methods

Upland hardwood hammocks would be targeted for pre-clearing surveys. Surveys would be conducted by pedestrian transects approximately 50 to 75 feet apart. Nest trees, signs of fox squirrel foraging, and observations of individual species would be recorded and mapped. Any individuals observed during pre-clearing surveys would be relocated through directional clearing to adjacent undisturbed habitat.

Florida Mouse, State Species of Special Concern

Impacts

The Florida mouse is most frequently found in xeric, sandhill, and pineland communities in association with gopher tortoise burrows. Clearing of these habitats would directly impact the Florida mouse. Pre-clearing capture and relocation, as described in the following section, would be used to prevent the incidental taking of the Florida mouse. However, those individuals that avoid capture and relocation would likely perish.

Pre-Clearing Survey Methods

Pre-clearing surveys to determine the presence or absence of the Florida mouse are typically conducted at night since this species is nocturnal. However, during the winter months, trapping is conducted during daylight hours, due to low overnight temperatures (i.e., less than 50° F). During warm weather, traps are set in the evening and checked early the next morning, and vice versa during the winter months.

Aluminum Sherman live traps (pursuant to the FFWCC Wildlife Survey Methodology Guidelines (1988) to survey for the Florida mouse) are set within suitable habitat in association with active gopher tortoise burrows. Based on the amount of suitable habitat with active gopher tortoise burrows, between six and ten Sherman live traps per acres would be set. Captured mice would be immediately relocated to a recipient site containing suitable mouse habitat (which includes gopher tortoise burrows). Trapping would be conducted for at least four consecutive nights or until the trapping success drops below pre-determined levels for two consecutive nights.

Roseate Spoonbill, State Species of Special Concern

Impacts

One individual roseate spoonbill was observed flying over the Ona site, however, no individuals were observed foraging or roosting at the site. Therefore, it is unlikely that the proposed action would have a negative impact upon the continued existence of this state species of special concern.

Pre-Clearing Survey Methods

Pre-clearing pedestrian transect surveys through wetlands would be conducted to identify nesting activity of wading birds, including the Roseate Spoonbill. If pre-clearing surveys reveal active nesting, clearing activities would be restricted until the young have fledged and mining activities would be rescheduled accordingly. Clearing of any nests would require consultation with the FFWCC and a nest removal permit.

Florida Black Bear, State Threatened

Impacts

No evidence of black bear has been found at the Ona site to date. The Florida black bear uses a variety of forested landscapes including pine flatwoods, hardwood swamp, cypress swamp, cabbage palm forest, sand pine scrub, and mixed hardwood hammock (Humphrey, 1992). As no individuals have been observed, no direct impact to Florida black bears is anticipated. However, secondary impacts may include the temporary loss of potential habitats. Conservation easements functioning as corridors of natural wildlife habitat would be preserved in perpetuity providing potential habitat for Florida black bears.

Pre-Clearing Survey Methods

Hardwood hammock habitat and the edges of the forested wetland systems are usually the focus during pre-clearing surveys. Pedestrian transects are conducted approximately 50-75 feet apart. Bear tracks, scat, signs of foraging and marked trees are surveyed for throughout the wooded areas and along sandy paths adjacent to hardwood hammocks. Other upland habitats are spot-checked as well. Data is collected, recorded and mapped according to the findings. No evidence of black bear has been found at the Ona site to

DRAFT

date. However, if pre-clearing surveys reveal the presence of black bear, the individuals would be relocated to undisturbed habitat through directional clearing, conducted in consultation with the FFWCC.

Florida Pine Snake, State Species of Special Concern

Impacts

The Florida pine snake's range includes Hardee County. However, the preferred habitat (sandhill, sand pine scrub, and well-drained flatwoods) is limited to less than 1,000 acres on-site, or about five percent of the Ona site. No pine snakes have been observed at the Ona site. Therefore, it is unlikely that mining activities would produce any adverse impacts to the Florida pine snake. Short-term secondary impacts may arise from the loss of habitat. However, upon completion of reclamation the acreage of preferred habitat for the Florida pine snake would be similar to the existing conditions.

Pre-Clearing Survey Methods

Although the Florida pine snake was not observed during any of the wildlife surveys conducted at the Ona site, they were identified as having the potential to occur. Pre-clearing pit-trapping and/or drift fence surveys conducted in those areas of highest gopher tortoise burrow densities should result in the capture of any individuals on-site. The Florida pine snake's range includes Hardee County, but the preferred habitat (sandhill, sand pine scrub, and well-drained flatwoods) is limited to less than 1,000 acres on-site, or about five percent of the Ona site.

Since none of their preferred community types exist at the Ona site and primarily sub-optimal pine flatwoods habitat would be disturbed, it is unlikely that Florida pine snake populations would be threatened in the region. However, during pit trapping and/or drift fence surveys and gopher tortoise relocation, if a Florida pine snake is encountered, it would be relocated with the other species to conservation areas, or approved reclaimed habitat.

Osprey

Impacts

Ospreys, while no longer a listed species in Hardee County, are still a species of interest to local conservationists and measures would be taken to avoid any impacts. Ospreys nest in trees, power poles, or any high platform near open water. No impacts to ospreys are expected as a result of mining activities, due to the osprey's high mobility coupled with pre-clearing surveys to identify nesting areas.

DRAFT

Pre-Clearing Survey Methods

Pedestrian pre-clearing surveys would locate any active nests, and clearing activities would be restricted until the young have fledged. IMC currently holds a Depredation permit from the FFWCC to remove and relocate inactive osprey nests.

4.4.1.2 *Matrix Transport*

4.4.1.2.1 Slurry Matrix Transport (IMC's Proposed Action)

Slurry matrix transport should have no impact on threatened or endangered species of plants and animals with the exception of the initial land clearing during construction of the slurry transport system. Additional impacts could arise in the case of a ruptured transport pipe allowing slurry discharge to natural areas. However, the slurry matrix pipes would be located within the ditch and berm systems, which are designed to prevent disturbance of adjacent natural areas. At stream crossings, the slurry matrix pipes would be encased, and in the event of a rupture, the contents would be diverted to a catchment area capable of holding spill material.

4.4.1.2.2 Conveyor Transport

Impacts to listed species resulting from the construction of a conveyor system for matrix transport would be identical to the impacts of the proposed action, slurry matrix transport. These impacts would be limited to initial land clearing during construction of the conveyor system. As with the slurry matrix transport, the conveyor system would be located within the ditch and berm system. Therefore, a spill from the conveyor belt would be captured within the ditch and berm system.

4.4.1.3 *Matrix Processing*

4.4.1.3.1 Wet Process Beneficiation (IMC's Proposed Action)

Wet process beneficiation would not impact threatened, endangered, or special concern species of plants and animals at the Ona site.

4.4.1.4 *Plant Siting*

4.4.1.4.1 IMC's Proposed Plant Location

The proposed 150-acre Ona plant site location is within Section 25, Township 34 South, Range 23 East, and Section 30, Township 34 South, Range 24 East. Initially, ore mined from Ona would be transported to the Fort Green beneficiation plant. The construction of the new Ona beneficiation plant would likely commence no sooner than Ona mine year 2, and would require 24 to 36 months to complete. Currently, this area is vegetated with a mixture of improved pasture, shrub marsh, freshwater marsh, live oak, and hardwood-conifer mixed. Land clearing and preparation prior to construction of the beneficiation plant would result in the loss of natural habitat, which may impact listed plant and animal populations. Listed species observed in the plant site area include cardinal airplant, giant airplant, indigo snake and wading birds, while potential habitat for sandhill cranes and Sherman's fox squirrel is also present. Mobile species of wildlife are expected to migrate to adjacent undisturbed areas, while pre-clearing surveys would locate less-mobile individuals and plants to be relocated.

4.4.1.4.2 Other Plant Locations

Alternate Site #1 is situated immediately adjacent to a high-quality mixed wetland hardwood forest contained within Conservation Area #9, which is known to contain state listed plant species, including giant airplant, Florida butterfly orchid, leafless beak orchid. Construction and operation of the beneficiation plant adjacent this area may adversely impact the existing habitat for wildlife and state listed plant species.

Alternate Site #2 located within Conservation Area #11 contains high quality forested wetlands and palmetto rangeland surrounded by contiguous natural plant communities. Site #2 contains additional habitats that are to be left undisturbed including shrub marsh, live oak, freshwater marsh, and temperate hardwood communities. Construction of the beneficiation plant at this location would result in the loss of potential habitat for listed species, including wading birds, Sherman's fox squirrel, giant airplant, cinnamon fern, and cardinal airplant.

4.4.1.5 Water Management

4.4.1.5.1 Process Water Sources

During mining, rainfall runoff from active mining areas would be captured for use in the beneficiation and mining processes. Surface water capture would reduce the size of a given stream's watershed. The impact is not permanent and results in significantly reduced groundwater and/or surface water withdrawals. Surface water capture is not expected to adversely affect listed species of plants or animals. The impact of groundwater withdrawals is limited to drawdown in the FAS.

4.4.1.5.2 Discharge to Surface Water

Wastewater discharge to surface waters is not expected to have any impact on listed species of plants or animals. Discharges from the clay settling areas are through permitted NPDES outfalls, which are monitored regularly, and meet State of Florida surface water quality criteria. The State of Florida Class III Surface Water Quality Criteria are designed to promote recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife (62-302.530, F.A.C., 1996). Additionally, NPDES permitting requires acute and chronic toxicity tests of discharges to further ensure that no adverse impacts to aquatic biota in receiving waters would occur.

4.4.1.6 Sand and Clay Residuals Management

4.4.1.6.1 Conventional Settling (IMC's Proposed Action)

Conventional clay settling areas would be utilized to dispose of waste sand and clay. The clay settling areas are to be located on previously cleared and mined areas, therefore no adverse impacts to listed species should occur. Primary impacts may occur in the unlikely event of dam failure and subsequent release of clay waste and turbid waters into adjacent natural areas. The clay settling areas provide significant temporary water/wetland habitat for many species, and are heavily used by migratory waterfowl during the wintertime. Clay settling areas are critically important feeding, resting, and overwintering stops for migrating shore birds and ducks (Kale, 1992). In addition, a comparison of wading bird usage of natural versus artificial sites revealed that clay settling areas play an important role as seasonal habitat and may be especially important during periods of drought (FIPR, 1990).

4.4.1.7 Reclamation

4.4.1.7.1 Conventional (IMC's Proposed Action)

Reclamation activities relative to the protection of threatened and endangered species only involve the restocking portion of pre-clearing surveys and the capture process prior to the commencement of land clearing, as described by species in Section 4.4.1.1.1A and B. The actual reclamation activities (earth moving, planting, etc.) of the mined land would not typically impact federal- or state-listed species. The only exception is where listed species have occupied the active mine area (clay settling areas, etc.). In general, listed flora and fauna species would be protected by:

- Relocation to reclaimed suitable habitat or other protected areas elsewhere on IMC property, but not necessarily at the Ona site;
- Planned or natural reintroduction into reclamation areas, depending upon specific species requirements;
- Allowing the species to migrate to adjacent habitat on their own; and/or
- Protecting the habitat that is proposed not to be disturbed.

Listed Species Restocking

Part of IMC's current reclamation process is to restock listed species to areas that have been mined and reclaimed. The process typically involves the capture, transport, and release of listed species from the pre-clearing areas to undisturbed conservation or reclamation areas that are approved by FFWCC and/or USFWS as suitable habitat for each particular listed species (i.e., gopher tortoises and/or gopher frogs). Approved reclaimed recipient sites are typically contiguous with adjacent conservation areas.

DRAFT

Therefore, listed species would be restocked to reclaimed land within the Ona site as habitat matures and becomes available.

After determining the specific species present through pre-clearing surveys, the necessary permits to proceed with restocking of individuals and/or populations of listed species would be obtained. The pre-clearing surveys provide the basis for obtaining state and/or federal wildlife permits needed to restock fauna to reclaimed habitat or conservation areas.

If the conservation areas would not provide suitable habitat, listed species would be relocated to a reclaimed area approved by USFWS or FFWCC, as appropriate. Recipient site surveys are performed just prior to restocking, to avoid overpopulation of the host sites. Figure 4.4-1 illustrates currently approved IMC areas for gopher tortoise restocking at IMC's Fort Green Mine.

Species-specific proven scientific methodologies are utilized for all relocation programs. Typically, the first species restocked is the gopher tortoise. During the process of restocking gopher tortoises, IMC attempts to relocate any commensal species encountered. Non-listed species encountered are also restocked with pre-clearing restocking programs provided the individual or population can be introduced in a safe manner (i.e., water moccasins and rattlesnakes pose serious risk of injury). Non-listed species that have been restocked by past relocations include rabbits, hog-nosed snakes, rat snakes, various other snakes, frogs, beetles, cotton mice, box turtles, crickets, etc.

IMC intends to provide reasonable and appropriate protection for listed species identified during wildlife and specific species surveys to ensure that populations are not eliminated from the Ona site.

4.4.1.8 Product Transport

4.4.1.8.1 <u>Rail (IMC's Proposed Action)</u>

Rail transport should have no impact upon listed species of plants and animals occurring at the Ona site. Only minimal impacts would arise during the construction of new railroad tracks, which are limited to clearing native vegetation for the rail corridor. Prior to land clearing, surveys would be conducted to locate listed species, which would subsequently be captured and relocated. Additional impacts to species with limited mobility may arise in the event of individuals struck by oncoming trains.

4.4.1.8.2 <u>Truck Transport</u>

Impacts to listed species arising from truck transport are similar to those discussed above for rail transport.

4.4.2 IMC's Original Area to be Mined Alternative

Under IMC's Original Area to be Mined Alternative, all areas would be mined with the exception of the floodplains of Horse and Brushy Creeks. Impacts to listed species of plants and animals would be more significant when compared to the Proposed Action, due to the loss of an additional 1,757 acres of natural areas. The additional acreage includes habitats considered to be ecologically significant, which are more likely to support threatened and endangered species. Although pre-clearing surveys and relocation efforts would be conducted similar to the Proposed Action Alternative, the mining of these areas would reduce the habitat available for relocation of listed species during mining, as well as reduce the capability of listed species to naturally repopulate the area following reclamation.

4.4.3 Natural Systems Group Recommended Areas of Conservation Interest

Impacts to threatened and endangered species would be similar to the Proposed Action Alternative, although the total acreage of disturbance would be reduced by 2,867 acres. Listed species would be displaced during clearing and mining of 12,969 acres of the Ona site. Pre-clearing surveys would be conducted to capture and relocate those listed species that are unlikely to disperse, as described in the Proposed Action Alternative. The preservation of additional acreage would increase the habitat available for listed species to relocate during mining, and would provide a greater amount of habitat to support recolonization of reclaimed lands by threatened and endangered plants and animals. However, the most ecologically significant habitats that support listed species are proposed for preservation under the Proposed Action Alternative, whereas the recommended areas of conservation interest include additional lands that were not considered by the applicant to be unique or critical habitats for threatened and endangered plants and animals. As the majority of mined lands are to be returned to natural habitats, and the most ecologically significant habitats are to remain undisturbed, the impact to listed species is considered temporary. The Natural Systems Group Recommended Areas of Conservation Interest Alternative is not considered essential to reducing the impact to threatened and endangered species of plants and animals.

4.4.4 No USACE Jurisdictional Wetlands Impacts Alternative

To avoid any impacts to USACE wetlands, no stream crossings would occur, therefore only those areas that can be accessed by draglines currently in operation at the Fort Green Mine would be mined. If the Section 404 Dredge and Fill Permit Application submitted to the USACE were denied, the state and county permits may be modified to allow mining of approximately 1,122 acres of uplands on the western side of Horse Creek (five percent of the total acreage).

DRAFT

The No USACE Jurisdictional Wetlands Impacts Alternative would result in no mining impact to 4,901.0 acres of wetlands and 14,698.6 acres of uplands that cannot be accessed without crossing streams. These areas include several of the ecologically significant habitats at the Ona site, which are known to support state listed species of plants and federal- and state-listed animals. This alternative would result in the clearing of primarily improved pasture, palmetto prairie, and mixed hardwood-conifer communities. These are common in the remainder of the Ona site and in the surrounding region. The remainder of the site to the east of Horse Creek would have the same impacts as described for the No Action Alternative in the following section.

4.4.5 No Action Alternative

Under the No Action Alternative, the natural habitats occurring at the Ona site would likely be altered for other land uses. It is likely that the site would support agricultural and residential uses, which would require clearing of native communities, loss of habitat for listed species, and possible incidental taking of listed species, and would not require reclamation. Therefore, the impact to listed species from agricultural and residential uses would be permanent. Development of the Ona site to support agricultural and residential uses would reduce the probability of permanent preservation of critical habitat through conservation easements, which would protect areas that support threatened and endangered species of flora and fauna.

4.5 SURFACE WATER HYDROLOGY

Mining operations are not allowed to adversely impact waters of the US or the state. Federal and state laws, rules and permits regulate the water regime. The FDEP, the Water Management Districts, and the counties administer the regulations. The USEPA exercises oversight over certain regulations allowing the state "primacy" or approval to administer the programs as long as they comply with the USEPA guidelines, whereas the USACE directly regulates activities in waters of the US.

Only portions of the mine would be impacted by mining or disturbed at any given time. The remaining undisturbed areas would continue to follow their existing drainage pattern and report to the same drainage feature as before mining. Baseflows in streams would be maintained by ditch and berm systems along mining areas. Rainfall and excess water from surface water impoundments would be discharged through permitted NPDES discharge outfalls as a component of the receiving stream flow.

4.5.1 Proposed Action Alternative

4.5.1.1 Mining Methods

4.5.1.1.1 Dragline Mining (IMC's Proposed Action)

Prior to disturbing mining areas, IMC would design and construct a ditch and berm system capable of retaining all runoff from a 25-year, 24-hour storm event in accordance with USEPA and SWFWMD regulations. Similar systems would be designed and installed sequentially across the Ona site in advance of clearing portions of these tracts for mining. Figure 4.5-1 illustrates a cross-section that is typically used along property boundaries and Figures 4.5-2 and 4.5-3 illustrate how these systems are constructed along waterways such as Horse Creek.

The most significant impact on surface water flow would result from some areas of land periodically being removed from the natural drainage systems. However, the groundwater inflow/outflow and stream baseflows that are near an excavated open mine cut would be maintained by BMP ditch and berm or recharge well systems along all undisturbed areas, such as unmined floodplains, wetlands, and property boundaries. Direct rainfall runoff to streams would be reduced since some areas would be isolated from the natural drainage basins and would not contribute runoff to their flow.

To assess the potential impacts from the reductions in drainage areas, capture, and watershed budget analyses were performed. The capture analysis is more conservative in that it assumes that the entire drainage basin contributes equal runoff regardless of the land use characteristics. Since most mining takes place on upland areas, this analysis over estimates the impacts since the mined upland areas would not contribute the same proportional flow as a riparian wetland. The watershed budget analysis takes into account the differences between the runoff from a riparian wetland and the onsite uplands. The output from this analysis has been summarized into flow-duration curves to demonstrate the period of time when the changes in flows are likely to occur as a result of mining. This is of particular interest to the downtream water user since there are limitations on withdrawal during low flow periods.

IMC is proposing to temporarily capture surface water runoff from active mining areas. A capture analysis was prepared to assess the potential impacts of captured runoff on streamflows. The size of each drainage basin would vary depending on the extent of disturbance caused by mining. Table 4.5-1 presents the size and expected streamflow for each of the on-site drainage areas in five-year increments based on the results of the capture analysis. The comparison shows that the maximum impact caused from capture areas is expected to occur in about year 17 (2019). At that time, runoff from about 11,173 acres (54 percent) of the Ona site would be routed from the natural drainage system into the mine recirculation system. The resulting decrease in streamflows from on-site drainage areas is estimated to be 13.4 cfs in year 17 that corresponds to the maximum reduction of runoff from the site. Therefore, the worst-case scenario impacts on surface water are represented by the streamflow estimates for year 17. Note that the 11,173 acres include land that is reclaimed but not yet reconnected. This water would be captured within the mine recirculation system, and would be used in the mining process in lieu of groundwater withdrawals from the FAS.

In year 17, the on-site drainage areas to the Horse Creek basin would be reduced by approximately 7,684 acres from the natural basins and the estimated streamflow would be reduced by eight cfs. However, the average NPDES discharge returning water back to the Horse Creek basin is estimated to be 6.8 cfs. The resulting total on-site streamflow contribution to the Horse Creek basin would result in an average flow of 17 cfs, which is one cfs less than the streamflow under pre-mining conditions. For the eastern portion of the Ona site, the on-site drainage area draining to the Peace River would be reduced by approximately 3,487 acres from the natural basins and the estimated streamflow would be reduced approximately 4.2 cfs.

The maximum reduction of drainage area occurs in year 18 for the Peace River tributaries. At that time, the natural drainage area would be reduced by approximately 3,666 acres and the estimated streamflow would be reduced by 4.4 cfs. This represents 5.7 square miles out of the 1,367-square mile Peace River drainage basin above Arcadia, which is 0.42 percent of the basin.

A watershed budget analysis was prepared by Ardaman and Associates to assess the impact that watershed severances during mining would have on streamflows. Long-term (20-years) historical daily rainfall was used to develop estimated daily streamflows for the worst-case capture conditions for Brady Branch, Brushy Creek, Hickory Creek, Horse Creek, and Oak Creek. The results of the analysis were used to determine the percent of time a streamflow value is exceeded at the point where each stream exits the Ona mine property. The results of these analyses indicated that the predicted range of no flow days was the same during mining as for pre-mining, since the groundwater outflow during mining would be maintained along unmined wetlands and streams. Therefore, the reduction of onsite streamflows primarily results from a reduction of upland runoff.

Based on onsite modeling by Ardaman and Associates, a rainfall event that exceeds 0.5 inches is needed to produce significant surface runoff from upland areas. Runoff from such events can last for three to five days after the rainfall stops. To assess the number of rainfall events of this magnitude, the rainfall data at the Wauchula weather station was analyzed. The analysis indicated that rainfall events in excess of 0.5 inches occurred on less than ten percent of the days of record. Since these are the rainfall events that would produce significant upland runoff and since mining occurs primarily in upland areas, the significant impacts to streamflows from mining are only expected during a low frequency as well.

There is only one water user that withdraws surface water downstream of the mining area, i.e. the PRMWSA. The PRMWSA has a WUP, which limits the withdrawal to times when the Peace River flow is greater than 130 cfs at the USGS station at Arcadia. The maximum potential decrease in the average streamflow of the Peace River at Arcadia resulting from surface water capture at the Ona site is approximately 4.4 cfs based on the maximum capture area in the on-site Peace River tributaries. However, this maximum potential impact of 4.4 cfs reduction in flow is not expected because:

1. Reclaimed areas at the Ona site would have increased runoff from pre-mining because of immature vegetation;
2. The capture analysis conservatively assumes that runoff rates from upland areas are the same as runoff rates from wetlands, and;
3. The watershed budget analysis, which assumes different runoff characteristics for wetlands versus uplands, indicates that streamflow reductions during mining would only be expected to occur during high flow events, which occur less than ten percent of the time.

In addition, the PRMWSA reaches its maximum withdrawal capacity at a stream flow of 505 cfs, which occurs over 40 percent of the time. Therefore, the expected changes in streamflow during mining, which are expected only ten percent of the time during higher flows, are anticipated to have no significant impact on public water supply facilities.

During mining operations at the Ona site, disturbance of most of the significant drainage systems would be avoided. This avoidance would include most of the areas within the 25-year floodplain of Brushy Creek and the 100-year floodplain of Horse Creek. A small portion (254 acres or 13.6 percent of the 25-year floodplain) of Brushy Creek is proposed for mining. The temporary reduction of drainage area contributing directly to Brushy Creek would result in a slight reduction in peak flow and volume. However, that reduction would be minor relative to the contribution from upstream areas. The encroachment into the floodplain by the ditch and berm system would reduce the storage capacity, but this would be offset by the storage capacity provided by the mine recirculation system and by the reduction of drainage area during that period.

The Oak Creek watercourse and floodplain south of SR 64 has been channelized and cleared, thereby reducing the functional capacity of this portion of the creek. IMC proposes to return this system to a more natural flow way. To achieve this objective, IMC is proposing to temporarily divert the flow from this portion of the current Oak Creek artificial channel into a new, temporary, larger artificial channel sized to contain the 100-year flood event.

A BMP berm system would be constructed such that the berm would not be overtopped during the 100-year flood event. This would protect downstream property from adverse impacts by protecting against downstream flooding by containing all runoff from active mining areas during and after a 100-year storm event. Construction of the BMP berm and mine access corridor crossing would not affect off-site flood elevations throughout the pre-mining, mining, or reclamation phases. The design would be based upon hydrologic analysis such that the alternate flow-way would contain a 100-year flood event, and flood elevations at both the upstream and downstream property boundaries would be less than currently experienced.

Following relocation of the flow-way, IMC proposes to mine the former artificial channel and its associated floodplain, and subsequently, to reclaim a floodway system of forested wetlands. Following reclamation, flow would be routed through this reclaimed system. A discussion of the reclamation of this channel is included in Section 4.5.7.

4.5.1.2 Matrix Transport

4.5.1.2.1 <u>Slurry Matrix Transport (IMC's Proposed Action)</u>

The matrix would be initially transported by slurry pipeline to the Fort Green Southern Washer and then be transferred to the Fort Green Beneficiation Plant. At a later time, when conditions warrant, the matrix would be transported by slurry pipeline to the Ona Beneficiation Plant. The access corridors shown on Figure 2.2-1 are located to provide for the mine transportation needs, which includes ore (matrix) and waste (tailing and clay) transport. A leak or break in the matrix slurry pipeline near a stream could significantly increase the flow in the stream being crossed. The flow in the pipeline is estimated to be 40 cfs, which would more than double and triple the average flow in Horse Creek and Brushy Creek, respectively. However, this additional discharge is more than an order of magnitude below the modeled flood flow values for a mean annual storm event. Therefore, the potential effects on downstream flooding would be insignificant.

4.5.1.2.2 <u>Conveyor Transport</u>

The conveyor option would have less potential for surface water quantity impacts at stream crossings since the matrix would not be slurried. Therefore, the volume of the spill would be limited to the volume of the matrix being transported. In addition, the conveyor would be encased at stream crossings to protect streams from potential spillage.

4.5.1.3 Matrix Processing

4.5.1.3.1 <u>Wet Process Beneficiation (IMC's Proposed Action)</u>

DRAFT

The phosphate minerals are recovered at the processing plant by washing and screening for large particles, and through flotation for the small particles. The water used in the beneficiation process would be provided from a combination of surface water capture and groundwater withdrawal. The potential impacts from surface water capture and groundwater withdrawals are discussed in Sections 4.5.1.1. and 4.7.1.3, respectively. The ore slurry is initially introduced into the washer section where it is separated into four components: oversize phosphate rock, phosphate pebble, phosphatic clays, and feed material for the flotation section.

4.5.1.4 Plant Siting

4.5.1.4.1 IMC's Proposed Plant Location

The IMC proposed plant site would occupy approximately 150 acres, which is less than one percent of the Ona site. The impervious surface areas of the plant would result in an increase in surface runoff from this area. This runoff would enter the mine recirculation system, eliminating runoff contributing to stream flow from the plant area. The plant site area is less than eight percent of drainage area of Brady Branch at the southern property boundary, which would indirectly correspond to a small reduction in runoff. Other than impacts to some wetlands within the plant site area, no direct impacts on surface water bodies are expected from the proposed plant site location.

4.5.1.4.2 Other Plant Locations

The two other plant site locations would have similar impacts to surface water as described for the proposed action, since the plant site size and impervious area would be the same in each location. Plant site #1 (See Section 2, Figure 2.2-4) would potentially have less of an impact on surface water since it is located in primarily an upland area, whereas, plant site #2 has a greater potential for impacts since it is located primarily within wetlands. However, plant site #1 does include a drainage channel from a large wetland proposed for preservation. Therefore, if plant site #1 were chosen, the drainage channel would need to be rerouted around the plant site to minimize impacts to surface water.

4.5.1.5 Water Management

Water is an important ingredient in the phosphate mining operations in Florida. Water is used as a medium in which to transport ore from the mine site to the plant, to transport the feeds and products through the plant, and to transport the waste products away from the plant to disposal sites.

The competition for water use in Florida for public supplies, industrial use, and agricultural purposes has prompted conservation measures on the part of all water users. Mining and processing of phosphate requires large quantities of water. As shown in Table 2.2-3, phosphate mines in Florida have responded to the pressures for reduced water consumption by reducing their withdrawals by over 46 percent since 1991. For the proposed Ona site, approximately 96 to 98 percent of the water used in processing the phosphate ore is expected to be recycled. The phosphate industry has reduced its consumption of water by over 70 percent from 1975 to 2000. This reduction is described in the cumulative impacts section (see section 4.26.3.2.1).

Based on a water budget model for the Ona and Fort Green mines, IMC has estimated the amount of water consumed by the mining operations, including the recycled water, to be approximately 600 gallons per ton of product (IMC, 2002). For the first eight years of the mine life, the production is expected to average 2.5 to 3 million tons per year. From year nine through year 24, the production is expected to average approximately five to six million tons per year.

The water budget presented below for the Ona site includes the rainfall and ET from all of the drainage areas included within the recirculation system. The difference between the water entering the system from rainfall on the included drainage areas, and the water leaving the system because of ET, is estimated by IMC to be 13,798 acre-ft/yr (IMC, 2002).

4.5.1.5.1 Process Water Sources

A. Water Use Demands Analysis

The projected water use demands for the Ona mine project are presented in Table 2.2-4. Water use includes both groundwater and surface water. The sources of groundwater include both potable and non-potable water pumped from the FAS, either from existing wells at the Fort Green Mine or from new wells installed at the Ona site. The source of surface water includes the rainfall runoff from active mining areas that would be routed into the mine recirculating system. The average annual demand is presented in Table 2.2-5. The average annual demand is based on historical annual average rainfall conditions and the proposed average production rate of 2.5 to 6 million tons per year.

The majority of the water use for the Ona mine project is required in the mine recirculation system. This system is used to provide a detention time in the clay settling areas. Additionally, this system allows the clays to settle out from the water, which is accumulated during the beneficiation process and allows the mining process to have a clear source of water. As stated in the CDA, a volume of approximately 10,000 acre-ft is needed for a detention time of 15 days and a recirculation rate of 150,000 gpm (IMC, 2002). The change in storage of the mine recirculation system was calculated from a water budget analysis for the Ona site.

The following equation and analyses were performed as part of the CDA to calculate the storage:

DRAFT

$$\Delta S = R + M + O_d + S_i + C_r - C_e - T_e - P_e - E - ET - O_r - S_O$$

Where:

ΔS = Change in Storage
R = Rainfall captured by the mine recirculation system
M = Water entrained in the matrix
O_d = Water drained from the overburden into the mine cut
S_i = Seepage into the mine recirculation system
C_r = Water released by the sedimented clay during consolidation
C_e = Water entrained in the clay after sedimentation
T_e = Water entrained in the sand tailings after disposal
P_e = Water leaving the mine with the product
E = Evaporation from open water within the recirculation system
ET = Evaporation from soil surfaces and transpiration from vegetated surfaces within the mine recirculation system
O_r = Water entrained in the overburden during reclamation
S_o = Seepage out of the mine recirculation system

The amount of volume available in the recirculation system is dependent on two factors: 1) the rate at which the clay consolidates, and 2) the rate at which the clay settling areas are constructed. Supplemental water is added to the system when the residence time drops below the required time for the settlement of clays, while a release of water from the recirculation system occurs when the maximum storage has been reached. The maximum storage is determined primarily by the amount of storage available within the clay settling areas and mine cuts. The amount of storage available within the clay settling area depends on the rate at which the clay consolidates and on the rate at which the settling areas are constructed. A maximum storage volume of 10,000 acre-ft was used in the water budget analysis.

Rainfall

A description of the components in the annual water budget analysis indicates that the most variable component of the analyses is the annual rainfall amount. The rainfall used in the monthly water balance is the actual monthly rainfall for the Wauchula weather station for the period January 1973 through December 1994 as a reasonable prediction of future rainfall at the Ona mine site.

Matrix Water

The amount of water added to the recirculation system water balance by the matrix is dependant upon the in-situ moisture content of the matrix, and of the amount of mined matrix in order to produce 2 to 6 million tons of product each year. The volume of matrix mined each year was estimated to be about 31,530,000 cubic yards on the average. The matrix moisture content of 23.7 percent was determined from the matrix mass balance.

Overburden Drainage

The specific yield would be the controlling factor for the amount of water released from the overburden into the recirculation system. The amount of overburden removed in order to expose the volume of matrix needed to produce two to six million tons of phosphate product, would vary each year. As presented in the CDA, the specific yield estimated from the aquifer performance test is ten percent (IMC, 2002). This resulted in an average overburden drainage volume of approximately 2,700 acre-ft per year, which was determined from reserve analysis and the specific yield.

Seepage into the Mine Cut

Within the water budget analysis for the Ona site, the amount of water that seeps into the mine cuts from the adjacent ground depends on the net rainfall effect on the contributing area. Net rainfall effect is the difference between the rainfall and the ET of the surrounding soil and vegetation. The contributing area was estimated to be 600 feet in width and four to ten times the length of the average mine cut, which was estimated at 2,750 feet.

Clay and Tailings Entrainment and Product Water

In the CDA, the percent solids of the clay after sedimentation was estimated to be 19.5 percent (IMC, 2002), while the percent moisture of the sand tailings after disposal was estimated to be 18 percent using an in-place dry density of 105 pounds per cubic foot. There is a generation rate of about 22.8 million tons per year of tailings, and the consumed water during the disposal process is estimated to be 3,688 acre-ft/yr. The in-situ product moisture was estimated to be six percent. As a result, the estimated product water use is estimated to be 496 acre-ft/yr based on the proposed production rate of 2 to 6 million tons of phosphate product per year.

Clay Consolidation

The amount of water released from the consolidation of the clay was estimated from an analysis of the tons of clay disposed of and the average percent clay solids within each settling area during the period when the clay pond is within the recirculation system. The average clay content of the matrix was determined by IMC during the reserve analysis. An average clay solids of 28.8 percent was used in the water balance model presented, with a ten-year average to fill the clay settling area.

Evaporation and Evapotranspiration

The lake evaporation in the project area was 50 in/yr, and is consistent with other sources (FSU, 1981). The estimated values for the ET for the various land-uses within the mine recirculation and BMP ditch systems are presented in Table 4.5-2. The weighted average ET for areas other than the active mine pit and the active clay settling areas was estimated to be 32 in/yr.

Overburden Re-Saturation

A swell factor of ten percent was estimated for the overburden. The specific yield of the replaced overburden was assumed to remain constant from the pre-development conditions. It was assumed that 75 percent of the overburden would be refilled during reclamation and disposal activities.

Seepage Out of the Recirculation System (Groundwater Outflow and Deep Recharge)

The deep recharge from the recirculation system was assumed to be one in/yr and is consistent with other investigations. USGS reports that areas of very low recharge (zero to two in/yr) to the IAS and UFA occur in Hardee and northwestern DeSoto Counties (Ryder, 1985; Steward, 1980). The seepage out of the recharge canal was calculated to be five in/yr of the area captured within the mine recirculating system.

Water Balance Calculations

The water balance input variables of the IMC mine are presented in Table 2.2-5. The analysis was performed by varying the catchment area each year based on the Ona mine plan. Minimum water storage was assumed to be 5,000 acre-ft and maximum storage was 10,000 acre-ft. Sealing water was estimated to average 3.5 mgd.

Based on the monthly water budget analyses for the mine life and historical rainfall patterns, the average annual supplemental water requirements for the Ona site would vary between 0 mgd to a high of 17.46 mgd. The detailed analyses of the monthly water budget for the Ona and Fort Green mines is presented in Table 4.5-3.

The results of the analyses show that to meet the anticipated water demands of the project, IMC would need to use a combination of groundwater pumping and surface water capture for the proposed project water sources. These results are consistent with conclusions in the Areawide EIS that phosphate mines should utilize captured surface water to reduce groundwater pumping needs (USEPA, 1978).

Groundwater Withdrawal (IMC's Proposed Action)

According to the SWFWMD, the Ona site property has been identified as an area of no recharge to very low recharge. Therefore, the withdrawal of groundwater from FAS wells for the plant operation should have no significant impacts on surface water quantity. The Ona Mine is already included in IMC’s SWFWMD WUP. In issuing this permit, SWFWMD determined that water use would not have a significant impact on groundwater resources or on existing users.

Surface Water Capture (IMC's Proposed Action)

Sources of surface water include the numerous on-site streams and the capture of the rainfall catchment area. Other than the available storage in the CSAs during the filling, there is no water impoundments that are proposed as sources of process water for the Ona mine project. IMC is proposing to capture rainfall runoff from active mining areas within the mine recirculation system. IMC does not propose to use any source of surface water that discharges on or near the site as a source of water. The difference between the captured rainfall and the evaporation and ET would be used as water in the recirculation system. This surface water capture is included in the analysis and granting of the SWFWMD WUP.

There are no other sources of surface water that could be used as a reliable source of streamflow for the mining system. As stated in the MCC EIS, the quantity of water varies throughout the year varying with the seasonal weather patterns (USEPA, 1981a). Based on this reason, another source of water is needed for the continuous supply of water into the recirculation system. Capturing surface water for the recirculation system is the only available method that can be used to reduce the amount of groundwater needed to sustain the proposed project

The capture of rainfall runoff from, and direct precipitation onto, lands within active mining areas is considered Best Available Technology by the USEPA (see 40 CFR 136), and is incorporated into IMC's surface water discharge permits as specific conditions. Similar conditions are expected for the surface water discharge permits to be issued by FDEP for the Ona site. The capture of surface waters can affect resulting streamflows downstream, which has been one of the principal public concerns.

The analyses performed to predict changes in runoff demonstrate that any changes in flow at the downstream property boundaries, on either a specific storm event or annual average basis, would be very small and fall well within the ranges of hydrologic cycles experienced in Florida. More importantly, because mining of the Ona site simply represents a shift in the location of mining rather than a net increase in the lands to be used by mining operations, a net measurable effect on the downstream reaches of the Peace River is not expected. This is the only location within the region, or the watershed, where surface water is relied upon for water supply.

To minimize groundwater withdrawals, IMC proposes to maintain about 5,000 acre-ft of surge storage capacity in the mine water recirculation system. Consequently, direct surface runoff during storm events would not occur from disturbed portions of the mine area. The groundwater outflow from the upland areas to preserved riparian systems would continue during the mining process through the use of recharge systems installed between the disturbed areas and the riparian systems. In addition, direct surface runoff from the preserved riparian systems would continue during the mining process.

In conclusion, it is expected that, on a region-wide basis, there would be no net changes, and therefore, no adverse impacts, upon the surface or groundwater resources used for water supply in the region.

4.5.1.5.2 Discharge to Surface Water

The capture of rainfall runoff from active mining areas within the mine water recirculation system behaves much like natural systems in that when the storage areas are dry, the mine builds up the inventory (the same as natural systems). When the mine inventory is full, the mine discharges water to the stream systems through the NPDES outfalls.

Figures 4.5-4 and 4.5-5 present the historic volumes of groundwater pumping, rainfall, and NPDES surface water discharge at all of IMC's mining operations, and for only the IMC Four Corners Mine. A comparison of these figures shows that these graphs are very similar. Changes in amplitude and frequency of discharge are unrelated to groundwater pumping. Changes in discharge are directly related to rainfall frequency and intensity. During the eight years of monitoring illustrated, the mines discharged five times more water than was pumped (106 mgd discharge vs. 21 mgd well withdrawal). It was only during the most recent extreme drought year (2000) that there was more pumping than discharge. This is because the rainfall average on IMC property in 1999 was 42 inches and in 2001 was only 27 inches. During periods of high rainfall, the mines discharge large volumes of water. When rainfall amounts are lowered, the discharge volumes decline correspondingly (same as natural systems).

Furthermore, the two figures exhibit very common and similar response patterns to rain. The proposed lands being evaluated in this EIS are expected to perform in a similar manner since IMC is proposing comparable activities and management protocols for the Ona site.

Typically for the Ona site, the normal process flow and rainfall variations would be accommodated by the surge holding capacity of the rainfall collection facilities. However, during periods of excess rainfall, water would be discharged when the normal operating levels of the recirculating system are exceeded as is typical for other IMC mines. During such periods at the Ona site, IMC is expected to discharge water from proposed NPDES outfalls located along Horse Creek and Brushy Creek. Based on a 19-year simulation model performed as part of the CDA, the proposed water balance estimated an average discharge of 6.8 cfs (4.4 mgd) (IMC, 2002). This discharge corresponds to an estimated supplemental water requirement of 4.6 mgd based on modeling results. Comparing these values to the historic volumes of water and discharge presented in Figures 4.5-4 and 4.5-5 indicates that the modeling results are conservative for predicting discharge volumes. Utilizing the historic IMC mine information indicates that discharge volumes may be three to five times the supplemental water volumes, which could result in an average discharge of 20 to 30 cfs. As shown in Figure 2.2-6, IMC proposes to have two discharge points on Horse Creek and three discharge points on Brushy Creek. The modeled discharge quantity of 6.8 cfs is an order of magnitude below the average flow in Horse and Brushy Creeks combined. If the average discharge volume is based on the historical information and is 20 to 30 cfs, this would still be approximately half the combined average flow in Horse and Brushy Creeks. Therefore, no significant adverse effects are expected to occur from discharge quantities with regard to potential flood levels downstream from the Ona site. During periods of excess water in the recirculation system, the proposed discharges would partially offset the stream flow reductions from surface water capture in mining areas.

4.5.1.6 Sand and Clay Residuals Management

4.5.1.6.1 Conventional Settling (IMC's Proposed Action)

The beneficiation process is expected to generate approximately 170 million short tons of waste clay and 350 million short tons of sand tailings. IMC proposes to use conventional disposal methods (i.e. waste sand would be disposed separately from waste clay).

Initially, settling areas would be used to consolidate clays from the three to five percent solids content to approximately 30 percent after three to ten years. The disposal areas would be required to have dams to accommodate the large volumes of entrained water in the clays. Based on the water budget analyses for the Ona site, the average water entrained as part of the clay consolidation would be 29,942 acre-ft/yr. However, this would be partially offset by the release of 12,011 acre-ft of water per year resulting from clay consolidation.

The potential for dike failures is one of the primary concerns with aboveground settling basins. If a failure occurred at the Ona site, large volumes of water and clay could be discharged into Horse Creek or Brushy Creek. Depending on the volume discharged, the natural drainage patterns and stream flow through the property could be disrupted until clean-up efforts were completed.

From all the Ona clay settling areas combined, approximately 4,602 acres of the clay settling footprint would be for clay storage. The dike heights are estimated to be a minimum of 45 to 55 feet above natural grade. An analysis of dam failure would be prepared as part of the permitting for each of the clay settling areas. To minimize the risks of a dam failure, extensive engineering, design and monitoring would be needed. A discussion of the dam safety requirements is discussed in detail in Section 4.17. Since the implementation of state safety requirements (F.A.C. 62-672, 1999), dam failures are considered a remote possibility.

4.5.1.7 Reclamation

Based on IMC's proposed reclamation plan, after reclamation the site would consist of 7,989 acres (50.4 percent) of sand tailings fill areas with overburden cap; 3,685 acres (23.2 percent) of waste clay disposal areas; 386 acres (2.4 percent) of sand tailings; and 3,790 acres (23.9 percent) of overburden fill areas and disturbed natural ground. Except for the clay disposal areas and land and lakes areas, the final site grade would be within a few feet of the original grade. The topography of the site would be used to develop a post-reclamation drainage basin for the site that follows the pre-mine boundaries closely. A comparison of the pre- and post-mining drainage basin areas for each on-site stream is presented in Table 4.5-4. The comparison shows that the post-mining Horse Creek basin area would increase slightly (one percent increase) from the pre-mining basin area. Similarly, the tributaries draining east to the Peace River would have slightly less area post-mining (2 percent reduction) than pre-mining.

The proposed drainage system after reclamation is shown on Figure 4.5-6. A complete post reclamation vegetation and land use map including all reclaimed wetlands is shown on Figure 2.2-12. IMC would maintain the drainage system after completion of the development.

4.5.1.7.1 <u>Conventional (IMC's Proposed Action)</u>

In 2001, Ardaman & Associates developed a model to predict the change in flow from the Ona site as result of mining. Because ET is expected to increase slightly as a result of the increased wetland and lakes areas in the proposed reclamation plan, total runoff from the project site is expected to be somewhat smaller than under pre-mining conditions. The model was modified as part of the EIS evaluation in order to provide a comparison between all the Ona site acreage accounted for within the onsite drainage basins and the drainage basins based on an evaluation point in each stream. Table 4.5-5 summarizes the results of the modified post-reclamation hydrological analyses for the Ona site. These analyses were performed using the same methodology described for the pre-mining condition in Section 3.5.

The projected slight reduction in total discharge from the Ona site would result from the anticipated increase in ET after reclamation is complete. The ET is expected to increase as a result of the increased area of lakes and wetlands and the increased area of clay soils on the mine site after reclamation. The anticipated decrease in average annual stream flow between the pre-mining and post reclamation condition is approximately one cfs. The change in runoff occurs primarily for the larger storm events, as the base flow is not expected to change, and because upland areas do not normally produce direct surface runoff during smaller storm events (less than one inch rain).

DRAFT

The approximately one cfs decrease in average streamflow between the pre-mining and the post-reclamation conditions is the cumulative decrease in streamflow for all of the portions of the drainage areas at the Ona site. The change in average annual streamflow for each individual creek varies from a reduction of 0.6 cfs for Hickory Creek to an increase of 0.5 cfs for Brady Branch. Flow-frequency curves comparing the total runoff exiting the Ona site including upstream areas under pre-mining and post-reclamation conditions for each of the modeled basins, i.e. creeks passing through or originating at the Ona site are provided in Figures 4.5-7 through 4.5-10.

The flow-frequency curves for Horse Creek at Myakka Head and Arcadia are also attached as Figures 4.5-11 and 4.5-12, respectively. Figure 4.5-13 is the flow-frequency curve for the Peace River at Arcadia. These figures show that decreases in flow for all five creeks occur during relatively high flow. To produce these curves, the average daily streamflow is plotted on a log scale on the y-axis against the percentage of time the plotted streamflow value is exceeded. The flow corresponding to the 50th percentile is the median daily flow, i.e., one-half of the daily flows are higher and one-half of the daily flows are lower than this flow. For Oak and Brushy Creeks and Brady Branch, the decreases in flow occur above the 10th percentile streamflow, and for Horse and Hickory Creeks, the decrease in flow occurs above the 25th percentile streamflow. For the remaining 75 to 90 percent of the time, the streamflow (i.e., baseflow) would be greater under post-reclamation conditions than it was under pre-mining conditions.

The impact of reduced discharge during high flow periods is a slight reduction in the depth of flow in the high flow channel. A decrease in flow depth for a flowing stream has no cumulative adverse effect on the stream or the biota the stream supports. During periods of high flow, the riparian wetlands located on either side of the stream channel are saturated from groundwater outflow and recent rainfall and do not rely on streamflow for hydration. Likewise, a reduction in flow at Arcadia during high flow periods (i.e., when the flow is in excess of 1,000 cfs) would have no measurable effect on the ability of the PRMWSA to supply its customers.

Increased baseflow indicates that groundwater outflow is greater than the amount required to satisfy riparian wetland ET. Increased baseflow may decrease the number of no-flow days on the property and downstream from the property. Decreasing the number of no-flow days in the low-flow channels of Brushy, Oak, and Hickory Creeks and Brady Branch would not result in a cumulative adverse impact either on the property or downstream. Increased baseflow would extend the number of days when the PRMWSA can withdraw water during low flow conditions. Based on the results of the streamflow modeling by Ardaman and Associates, it is unlikely that adverse changes to streamflows would occur from reclamation.

DRAFT

The reclamation of the Oak Creek watercourse and floodplain would begin after mining of the existing artificial channel and associated floodplain are complete. Use of the proposed alternate temporary flow way would continue until the proposed reclamation plan including the growing seasons required for establishment of the post-reclamation vegetation is completed. The final reclamation step would be the re-routing of flow into the reclaimed wetlands from the temporary alternate flow way and the subsequent regrading and revegetation of the then former temporary, alternate flow-way. The re-routing would result in the following hydrological benefits when compared to existing conditions:

- Flow gradients would be reduced to attenuate fluctuations in the wetland soil moisture;
- Peak flow would be reduced without reducing the total flow of water which would drain into Oak Creek; and,
- Flood elevations would decrease slightly.

The size of the Oak Creek drainage basin upstream of the proposed floodplain forest is similar to the drainage areas that supplied surface water to the most successful forested systems observed by the FIPR researchers.

4.5.1.8 *Stormwater Hydrologic Analysis*

To identify any potential flooding and erosion problems, a stormwater analysis was performed using the existing and proposed drainage patterns. The existing drainage patterns are shown on Figure 4.5-14.

The Ona site is primarily drained by six stream systems, all of which eventually drain into the Peace River. The primary stream systems within the property are West Fork Horse, Horse, Brushy, Oak, and Hickory Creeks, and Brady Branch. West Fork Horse Creek is a tributary of Horse Creek, which is a tributary of the Peace River. Brady Branch is a tributary of Brushy Creek, and Brushy Creek is a tributary of Horse Creek. Oak Creek and Hickory Creek are tributaries to the Peace River. A mine-wide hydrologic analysis has been prepared as part of the CDA that evaluates pre-mining versus post reclamation flow at 19 evaluation points shown on Figure 4.5-14.

The hydrologic analysis shows that the post reclamation peak flow from 25-year and mean annual frequency storm events would not exceed the pre-mining peak flow by more than five percent. In addition, the volume of post reclamation runoff from a 25-year storm would be within 85-100 percent of the pre-mining runoff during the 72-hour period after commencement of the storm.

The hydrologic analysis described above assumed that all lakes and wetlands were full at the beginning of the storm event in accordance with BMR/TSS guidelines; therefore, no stage/storage attenuation has been utilized. The proposed reclamation plan consists primarily of natural ecological systems and agricultural lands, and no drainage structures have been proposed. The hydrologic analysis utilized an SCS Type II modified storm distribution as prescribed by the BMR/TSS, and both the pre-mining and post reclamation conditions were analyzed for mean annual (4.5 in) and 25-year (8.0 in) frequency storm events.

In summary, after reclamation, the wetland acreage on the property would increase by about 10 percent, and another three percent of the property would be reclaimed as recreational lakes. The two stream segments directly impacted by mining, Oak Creek south of SR 64 and the headwater tributary to Hickory Creek, would be reclaimed to eliminate the channelization and ditching that has occurred historically. The flow regime that would result is a reduction in flood elevations and peak flow during a 24-hour, 25-year storm event without a meaningful reduction in the total flow generated by the storm. Average annual flow regimes would be reduced slightly because of the increased ET losses created by the increased wetland acreage and the creation of the recreation lakes, all of which seem to be considered beneficial by the ecosystem management permitting team.

Therefore, based on the post reclamation storm event modeling, no significant adverse impacts are expected to the storm flows of the surface water systems that flow from the property as a result of reclamation.

4.5.1.9 Product Transport

4.5.1.9.1 <u>Rail (IMC's Proposed Action)</u>

There would be no significant impact on surface water quantity resulting from a spill during rail transport.

4.5.1.9.2 <u>Truck Transport</u>

There would be no significant impact on surface water quantity resulting from a spill during truck transport.

4.5.2 IMC's Original Area to be Mined Alternative

4.5.2.1 Mining Methods, Matrix Processing, and Plant Siting

Surface water quantity impacts associated with this alternative would be greater than those described for the Proposed Action Alternative. While most of the floodplain associated with Horse Creek, West Fork Horse Creek and Brushy Creek would be undisturbed, additional wetland areas on the site would be mined and reclaimed. Under this alternative, 1,757 additional acres would be disturbed, of which 924 acres (approximately 53 percent) would be wetlands. These additional acres would extend the

DRAFT

life of the mine approximately three years. The expected capture of rainfall in mined areas would be similar to the Proposed Action Alternative, since areas would be reclaimed as mining progresses. However, the remaining streamflow would be lower during mining as a result of the disturbance of these additional areas because of the high percentage of wetlands they contain. In general, these wetlands would contribute higher runoff than uplands in the drainage basin. With regard to duration, reduced flows resulting from drainage basin reductions would be expected to occur for approximately three additional years since the life of the mine would be extended.

The transport of matrix would be similar to the Proposed Action Alternative with the exception of the number of stream crossings. Since areas that are proposed for preservation would be mined with this alternative, several stream crossings would be eliminated. Therefore, under this alternative, there would be a slight reduction in potential for impacts to streamflows offsite from a pipeline break, since several stream beds would be removed.

Matrix processing would require water from both surface capture and groundwater withdrawals. Assuming the rate of mining would be the same as the Proposed Action Alternative, the water requirements would be similar. The primary difference is that the water demand would occur over a longer time period corresponding to the additional mine life.

Plant siting would not be affected by this alternative since all three of the potential sites would be included in areas to be disturbed. With regard to water management, the water use and discharge would be similar to the Proposed Action Alternative, except for a longer time period corresponding to the additional mine life.

4.5.2.2 Sand and Clay Residuals Management

This alternative would accommodate the proposed locations for the sand and clay residuals management plan. However, assuming similar dam heights and settling area depths as the Proposed Action Alternative, approximately 1500 acres would be needed to dispose of the clay generated from the matrix mined to produce the additional 34 million tons of phosphate. Although dam failures are considered a remote possibility, there would be a slightly higher risk of impacts to streamflow from a failure with this alternative since additional clay settling areas would be needed.

4.5.2.3 Reclamation

The general characteristics of the proposed reclamation could also be accommodated with this alternative. However, the plan would also include some additional areas of pasture and wetlands in the clay settling areas as well as typical reclamation of primarily upland communities in tailings/overburden fill areas. Streamflows after reclamation would be similar to the values estimated for the Proposed Action Alternative.

4.5.3 Natural Systems Group Recommended Areas of Conservation Interest

4.5.3.1 Mining Methods, Matrix Processing, and Plant Siting

Surface water quantity impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. Most of the floodplain associated with onsite streams, e.g. Horse Creek, West Fork Horse Creek and Brushy Creek would be undisturbed. In addition, various uplands and wetlands including the lower reach of Oak Creek would not be mined. Under this alternative, the disturbed area would decrease by 2,867 acres, of which 777 acres (approximately 27 percent) would be wetlands. This reduced mineable acreage would decrease the life of the mine approximately 4 years. The expected quantity from captured rainfall and resulting onsite streamflows during mining would be similar to the Proposed Action Alternative. However, with regard to duration, the reduced streamflows would be expected to occur for approximately four less years.

The transport of matrix would be similar to the Proposed Action Alternative including the number of stream crossings for access corridors. Matrix processing would require water from both surface capture and groundwater withdrawals. With a similar rate of mining as the Proposed Action Alternative, the water requirements would be the similar, except the demand would be a shorter time period as a result of reduced beneficiation for the decreased phosphate production.

Plant siting would be affected by this alternative since portions of the Proposed Action Alternative and Plant Site #2 would be included in areas to be preserved. With regard to water management, the water use and discharge would be similar to the Proposed Action Alternative, except for a reduced period as a result of the decreased mineable acreage.

4.5.3.2 Sand and Clay Residuals Management

This alternative would not accommodate the proposed locations for the sand and clay residuals management plan, since many of the proposed settling areas would be affected by the preservation acreage. However, approximately 800 acres less would be needed to dispose of the clay generated from the matrix mined based on a reduction of 18 million tons of phosphate production. Although dam failures are considered a remote possibility, there may be slightly less risk of impacts from a failure with this alternative since fewer clay settling areas would be needed. However, this advantage may be offset by less efficient clay settling areas that may require more dam length for the equivalent storage capacity because of interference with preservation areas.

4.5.3.3 Reclamation

The general characteristics of the proposed reclamation could not be accommodated with this alternative. Areas of clay settling would not be placed where they are presently planned. The plan for this alternative would contain less areas of pasture and wetlands in the clay settling areas as well as less reclamation of uplands in tailings/overburden fill areas because of the reduced mining acreage. Several proposed lakes would need to be relocated since their present location would be in conflict with preservation areas. Streamflows after reclamation would be similar to the values estimated for the Proposed Action Alternative, if the proposed lakes were included in this alternative. If some lakes were eliminated, the expected flows after reclamation would be slightly higher because of reduced evaporation losses.

4.5.4 No USACE Jurisdictional Wetlands Impacts Alternative

To avoid any impacts to USACE jurisdictional wetlands, no stream crossings could occur, therefore only those areas that can be accessed by draglines currently in operation at the Fort Green Mine would be mined. If the Section 404 Dredge and Fill Permit Application submitted to the USACE is denied, the state and county permits may be modified to allow mining of approximately 1,122 acres of uplands on the western side of Horse Creek (five percent of the total acreage).

The No USACE Jurisdictional Wetlands Impacts Alternative would result in a maximum of 1,122 acres of surface water capture area. This would result in small reductions in stream flow in Horse Creek and the west fork of Horse Creek (a total of 1.5 square miles compared to a 42 square mile drainage basin). Other impacts for matrix transport, matrix processing, plant site, and water management would no longer apply to this alternative. The impacts from sand and clay residuals management and reclamation would be limited to the area of mining, which would be approximately seven percent of the IMC proposed action acreage. Therefore, no significant impacts would be expected from this alternative assuming environmental protection measures similar to those described for the proposed action were implemented. Impacts to the remainder of the site left undisturbed would be similar to those described for the No Action Alternative in Section 4.5.3.

4.5.5 No Action Alternative

Under the No Action Alternative, no significant changes to the existing surface water quantity are expected in the near future. No alterations to the present stormwater flow would be expected while land use patterns remained the same. The baseflow to the streams and hydrologic characteristics of the streams would remain the same. The channelization alterations to Oak Creek would remain and the proposed IMC improvements to the floodplain and stream channel would not be performed. On a long-term basis, as described in Section 2.1.4, the land use in areas of the site is expected to

DRAFT

change. Based on development pressure from anticipated increased population along roads near the site, impervious areas are expected to increase with development. An increase in urbanization could result in slight increases in runoff as compared to existing hydrology patterns depending on mitigation implemented at the time of development. If the land was converted to intensive agriculture, there may be an increase in baseflow of streams resulting from irrigation during the dry season as compared to existing conditions. The effects of this on water quality are discussed in Section 4.6.3.

4.6 SURFACE WATER QUALITY

Phosphate mining has been conducted in the Peace River basin area by IMC for many decades. IMC's existing operations have been issued NPDES permits for the discharge of excess water and stormwater. All discharges must satisfy permit limits and not result in water quality standard violations. The quality of IMC's mine process water is good, once suspended solids are allowed to settle.

4.6.1 Proposed Action Alternative

4.6.1.1 Mining Methods

4.6.1.1.1 Dragline Mining (IMC's Proposed Action)

Prior to disturbing mining areas, IMC would design and construct ditch and berm systems capable of retaining all runoff from a 25-year, 24-hour storm event in accordance with USEPA and SWFWMD regulations. As new perimeter berms are constructed, the following features would be used for erosion control.

1. Silt screens are installed at the base of the berm. These screens are inspected and maintained as required.
2. Grass is planted on the exterior slope of the berm.
3. The berm is sufficiently flat in slope to prevent erosion.
4. The roads on top of the berms are sloped toward the mine and away from the adjoining property or wetland.

Similar systems would be designed and installed sequentially across the Ona site in advance of clearing portions of these tracts for mining. Section 4.5.1.1.1, Figure 4.5-1 illustrates a cross-section that is typically used along property boundaries, and Figures 4.5-2 and 4.5-3 illustrate how these systems are constructed along waterways such as Horse Creek. The proposed system would prevent potential surface water quality impacts off-site by achieving the following multiple environmental objectives:

1. Turbid water from on-site activities are contained;
2. Stormwater runoff from disturbed areas is contained; and,

3. The potential for off-site dewatering of the SAS beneath off-site properties is counteracted by recharge from the ditch or well system.

Use of these systems also facilitates compliance with FDEP NPDES discharge permit, the SWFWMD WUP, and constitutes stormwater BMPs.

Surface waters from areas that have been prepared for mining and reclaimed but have not yet completed re-vegetation would be contained on-site and added to the recirculation water system. Particulate normally found in this water would be allowed to settle out into clay settling areas. Table 4.6-1 shows the expected ditch water quality as based on data from other mines. These data indicate that the water quality in the ditch system is generally good. Water for the ditch and berm system can come from a number of sources. Initially, the perimeter ditch and berm system serves to contain any runoff from the future mining area. After active mining starts, the perimeter ditch and berm switches into serving as a “recharge” ditch. The proposed mining area is encircled with a perimeter ditch and berm to capture any stormwater runoff from the disturbed area. After mining begins and depressional storage is created, most of the stormwater is handled within the mining excavations. A second source of recharge water is groundwater pumped from wells used to dewater the mining area. Water may also be pumped directly out of previously mined excavations and discharged into the perimeter ditch. In both cases, water is purposefully pumped into the ditch to act as a hydraulic barrier against draining adjacent wetlands or properties.

As shown on Figure 2.2-1, IMC proposes to mine lands adjacent to the current artificial Oak Creek channel. Throughout this period, the BMP berm system and the proposed temporary alternate flow way channel would be maintained, as would the proposed dragline/utility access corridor across the proposed alternate channel.

The Oak Creek BMP berm system would be designed to contain the 100-year flood event, thereby protecting downstream property from adverse water quality impacts. The proposed mining and flow-way construction sequence allows the alternate temporary flow-way to become stabilized before flow is diverted into this channel from the existing artificial channel. Together with the much larger cross-sectional area of the proposed temporary alternate flow-way, the proposed mining sequence would ensure maintenance of water quality. The alternate flow way would contain herbaceous wetland vegetation that would provide water quality treatment through sedimentation of suspended solids and nutrient uptake.

Table 4.6-2 compares typical NPDES outflow water quality values with Horse Creek and Brushy Creek existing water quality data measured near the IMC Ona site. Data collected at the IMC surface water quality stations is summarized in Section 3.6. Table 4.6-2 presents the parameters that would typically be regulated as part of the permitted NPDES

DRAFT

discharge for a phosphate mine. Both Brushy and Horse Creeks are Class III surface water bodies at the proposed points of discharge. A comparison of the receiving stream water quality and the expected discharge quality indicates that the discharges into the receiving streams have the potential to cause an increase in pH, conductivity, dissolved oxygen, phosphorus and sulfate concentrations, and a decrease in fluoride concentrations.

pH

The pH of the receiving streams varied, as measured in the on-site monitoring from 1999 to 2001, from 5.04 to 7.42 and 5.4 to 7.07 standard units in Horse Creek and Brushy Creek, respectively. These creeks are slightly acidic, but most values are within the Class III criteria. The range of the pH values from a typical NPDES outfall is from 6.8 to 8.2 standard units. The potential increase in pH to the receiving streams may raise the low pH values (which violate standards) to be within the Class III water quality standard of between 6 and 8.5 units depending on the proportion of the discharge to streamflow. The pH values that are typical for natural stream systems vary between 6.1 to 7.9 units with a median value of 7.1 (FDEP, 1996).

Conductivity

The measured conductivity values for Horse Creek and Brushy Creek varied from 47 to 388 µmhos/cm. The potential increase of conductivity within the on-site streams from NPDES discharges (maximum of 500) is expected to be less than one-half the allowable Class III water quality standard of 1,275 µmhos/cm. Typical ranges of conductivity for natural systems can vary between 100 to 1,300 µmhos/cm for fresh waters with a median value of 335 µmhos/cm (FDEP, 1996).

Temperature

The measured temperature values in the receiving streams near the Ona site varied between 9.2° to 29.8° C for the Horse Creek and Brushy Creek. The typical NPDES outfall temperature range falls within the measured values near the Ona site, therefore no appreciable variation is expected in measured temperature values. Typical temperature values for natural systems vary between 19° and 28° C for Florida streams with a median value of 23°C (FDEP, 1996). There is no Class III surface water quality standard for temperature.

Dissolved Oxygen

The measured dissolved oxygen concentrations in Horse Creek and Brushy Creek near the Ona site varied between 1.6 to 8.3 mg/l. The typical NPDES outfall concentration is expected to vary between 5.0 and 8.0 mg/l. The potential increase in dissolved oxygen concentrations may approach the minimum Class III surface water standard of 5.0 mg/l, thereby improving the natural water quality for natural streams. Expected concentrations

DRAFT

of dissolved oxygen in Florida streams typically vary between 3.1 to 8.0 mg/l with a median value of 5.8 mg/l (FDEP, 1996).

Total Suspended Solids (TSS)

Measured concentrations of TSS near the Ona site varied between 1 and 29 mg/l for Horse Creek and Brushy Creek with averages of 2.4 mg/l and 4.75 mg/l for Horse Creek and Brushy Creek, respectively. The expected NPDES discharge concentration range of 1 to 10 mg/l would not adversely impact the receiving water bodies. Typical TSS concentrations for Florida streams vary between 2 to 26 mg/l with a median concentration of 7 mg/l (FDEP, 1996). There is no Class III surface water quality standard for TSS.

Nonvolatile Suspended Solids (NVSS)

Measured concentrations of NVSS near the Ona site varied between 1 and 19 mg/l for Horse Creek and Brushy Creek. The expected discharge concentration range of 1 to 5 mg/l would not be expected to adversely impact the receiving water bodies. There is no Class III surface water quality standard for NVSS.

Total Phosphorous

Total phosphorus in Horse Creek and Brushy Creek near the Ona site varied between 0.17 and 1.32 mg/l with an average of 0.48 and 0.62 mg/l for Horse Creek and Brushy Creek respectively. These concentrations are above concentrations that would be expected for Florida systems, which vary between 0.02 and 0.89 mg/l with a median concentration of 0.09 mg/l (FDEP, 1996). This could be expected because “many parts of Florida have relatively high natural concentrations of phosphate, largely because of phosphorus-bearing rocks and soil” (Fernald and Patton, 1984). The expected NPDES discharge concentrations of 0.4 to 1 mg/l is not expected to increase the concentration of the receiving water system. In addition, this system is nitrogen limited as the nitrogen to phosphorus ratio is approximately one. There is no Class III surface water quality standard for total phosphorus.

Total Nitrogen

Measured concentrations of total nitrogen near the Ona site varied between 0.45 to 5.02 mg/l in Horse Creek and Brushy Creek with averages of 1.36 and 1.85 mg/l for Horse Creek and Brushy Creek, respectively. The expected NPDES discharge concentration range of 0.6 to 1.3 mg/l is not expected to adversely affect the receiving stream systems since it falls within the range presently experienced by the streams. Typical values of 0.5 to 2.7 mg/l have been recorded for Florida streams with a median concentration of 1.2 mg/l (FDEP, 1996). There is no Class III surface water quality standard for total nitrogen.

DRAFT

Sulfate

Sulfate concentrations have been measured to range from 2 to 76 mg/l in Horse Creek and Brushy Creek near the Ona site. Typical NPDES discharge concentrations of 40 to 150 mg/l might increase the streams' sulfate concentrations. There is no Class III surface water quality standard for sulfate. However, as a comparison, the expected discharge concentrations are well below the Class I (potable water supply) surface water standard of 250 mg/l, and are therefore, not expected to adversely impact the receiving streams.

Chlorophyll-a

Measured concentrations of Chlorophyll-a near the Ona site varied between 1 and 16 mg/l in Horse Creek and Brushy Creek. The estimated discharge concentrations of between 2 to 8 mg/l are not expected to increase the concentration in the natural systems. Typical values of 1.0 to 30 mg/l have been recorded for Florida streams with a median of 6.0 mg/l (FDEP, 1996). There is no Class III surface water quality standard for Chlorophyll-a.

Fluoride

Fluoride concentrations in Horse Creek and Brushy Creek near the Ona site varied between 0.03 to 0.62 mg/l. The expected NPDES discharge concentration of 0.1 to 0.3 mg/l may decrease the overall loading to the natural system, but is still within the expected range of 0.1 to 0.8 mg/l for natural stream systems (FDEP, 1996). This potential decrease in fluoride concentration would maintain stream concentrations below the Class III water quality limit of 10.0 mg/l.

The expected water quality discharged from the NPDES outfalls are not expected to adversely affect the water quality in Horse Creek and Brushy Creek. The potential increase for dissolved oxygen and pH from NPDES discharges relative to the existing stream water concentrations would generally improve water quality conditions within the streams and has the potential to reduce the number of naturally occurring water quality contraventions of Class III criteria. The potential increases in conductivity are not expected to approach limiting Class III standards. The potential increase in phosphorus concentrations are not cause for concern as the systems would be nitrogen limited and would not develop excessive plant growth beyond the amount of available nitrogen in the system. The potential impacts to the water quality are expected to be minimal and the typical NPDES outfall concentrations listed in Table 4.6-2 are within the range reported for natural systems in Florida.

4.6.1.2 Matrix Transport

4.6.1.2.1 Slurry Matrix Transport (IMC's Proposed Action)

The matrix would be initially transported by slurry pipeline to the Fort Green Southern Washer and then transferred to the Fort Green Beneficiation Plant. At a later time, when conditions warrant, the matrix would be transported by slurry pipeline to the Ona Beneficiation Plant. The access corridors shown on Figure 2.2-1 are located to provide for the mine transportation needs, which includes ore (matrix), sand, and clay transport. The mining sequence proposed by IMC also minimizes the number of dragline and pipeline access corridor crossings of “no-mine areas of conservation interest” including the floodplains of the West Fork of Horse Creek and Brushy Creek. To minimize impacts, IMC has positioned the unavoidable corridor crossing locations (where possible) at areas where the area of conservation interest has already been impacted (e.g., at existing crossings of Brushy Creek or adjacent to SR 64).

A leak or break in the matrix slurry pipeline near a stream could significantly increase the sediment and suspended solids of the receiving water. The primary protection is provided by the BMP system of earthen berms, which are designed to prevent pipeline spills from reaching the natural areas including the creeks. The potential impacts to water quality would be temporary until clean-up actions were performed. In order to protect the streams from a pipe break, the slurry pipelines would be encased at stream crossings. In the event of a break, the contents would be diverted to a containment area rather than being released into the stream. The containment areas would be sized based on the slurry line capacity and estimated time until the line could be stopped for repair.

4.6.1.2.2 Conveyor Transport

The conveyor option would have less potential for surface water quality impacts at stream crossings since the matrix would not be slurried. Therefore, the volume of the spill would be limited to the volume of the matrix being transported. In addition, the conveyor would be encased at stream crossings to protect streams from potential spillage.

4.6.1.3 Matrix Processing

4.6.1.3.1 Conventional Beneficiation (IMC’s Proposed Action)

The phosphate minerals are recovered at the processing plant by washing and screening for the larger phosphate particles, and through flotation for the smaller sand-sized particles. Within the beneficiation plant, a number of organic and inorganic reagents are used in the various steps of the flotation process. Table 4.6-3 indicates the type of reagent concentration in the process water, and consumption quantities for typical operation. The large volume of water associated with the in-plant recovery process significantly dilutes the reagents. Natural biological activity and/or adsorption of the chemicals on the deposited clays further reduce the low concentration of reagents. A brief description of the reactions associated with each of these reagents is provided below.

DRAFT

A. Fatty Acid

Fatty acid reacts with the phosphate rock, clays, and cations (positively charged ions) in the water to form insoluble, biodegradable soaps. Most of this reagent is ultimately absorbed on the clays and then deposited in the clay settling areas.

B. Sulfuric Acid

Sulfuric acid breaks down into sulfate and hydrogen ions. The sulfate enters into the sulfur cycle, which results in an increase in the sulfate concentration within the flotation system when compared to the other areas of the recirculation system. The hydrogen ion (acidity) reacts almost immediately with the alkalinity in the rock and other reagents, and the resulting pH of the water and slurry flows is near neutral.

C. Fuel Oil and Kerosene

These substances evaporate, form emulsions, and can be used as food for bacteria. Much of the oil is adsorbed by the clay, and does not enter the water cycle.

D. Amines

The relatively small amount of amine is distributed on the clay solids. Amines have a strong affinity for clay surfaces, resulting in negligible quantities in the water phase.

E. Ammonia

At one time ammonia was the best source of hydroxyl radicals. It has since been discontinued in favor of soda ash.

F. Soda Ash

No buildup of chemical species has been noted because the natural biochemical activity in the clay settling areas maintain equilibrium (sodium and carbonate are common ions).

G. Ferrosilicon or Magnetite

Ferrosilicon is not a reagent in the usual sense as it is a very finely ground powder that does not go into solution. Any solids leaving the plant would end up in the clay settling areas, or tailings backfill. The ferrosilicon does not enter the water phase. Some ferrosilicon is shipped with the phosphate product. Magnetite reaction is the same as ferrosilicon.

The actual concentrations of the reagents of any mine site discharges would be from zero to only an insignificant fraction of the level shown in the Table 4.6-3, as the reagents are consumed, degraded, or captured by the recirculation system. Data has been collected from clay and sand tailings process waste streams and is presented in Tables 4.6-4 and 4.6-5, respectively. These data indicate that the process water streams are generally of good quality. These water streams are “contact process generated” wastewater discharged directly from the flotation circuits and support the conclusion that the levels of the reagents are significantly reduced before entering the recirculation system. As discussed earlier, the NPDES effluent is comprised of the commingling of water from the various uses shown in Table 2.2-5, which results in further reduction of concentrations of constituents presented in Tables 4.6-4 and 4.6-5.

4.6.1.4 Plant Siting

4.6.1.4.1 IMC's Proposed Plant Location

The IMC proposed plant site would occupy approximately 150 acres. Since all plant site runoff would enter the recirculation system, no significant impacts to surface water quality would result from the plant location. In addition, IMC is proposing to install septic tanks to treat domestic wastewater. Therefore, no impacts to surface water streams are expected.

4.6.1.4.2 Other Plant Locations

The two other plant site locations would have similar impacts to surface water quality as described for the proposed action, since the plant site runoff would enter the recirculation system for any of the locations chosen.

4.6.1.5 Water Management

4.6.1.5.1 Process Water Sources

A. Groundwater Withdrawal

As discussed in Section 4.7.5, the FAS is separated from the water table aquifer and surface water streams by confining layers. Therefore, the withdrawal of groundwater from FAS wells is not expected to have any significant impacts on surface water quality.

B. Surface Water Capture

No significant impacts on surface water quality of existing streams are expected from capturing rainfall in the mine-recirculation system. As discussed in Section 4.5.1, the most significant impact to surface water flow would result from some land areas being removed from the natural drainage systems. A water budget analysis performed as part of the CDA indicated that reductions in flow are expected to only occur during rainfall events in excess of 0.5 inches. Therefore, no significant changes in streamflow or surface water quality are expected from smaller storm events of less than 0.5 inches. During periods of high streamflow, no significant changes in water quality are expected as a result of the reductions in surface water flow. A review of the stream water quality in drainage basins with mining and without mining is presented in the cumulative impacts section (see section 4.26.3.2.2). The results of the review of major data sources and associated reports found no indications of adverse changes in water quality as a result of mining and/or reclamation activity (BRA, 2002).

4.6.1.5.2 Discharge to Surface Water

Phosphate mining has been conducted in the Peace River basin area by IMC for many decades. IMC's existing operations have been issued NPDES permits for the discharge of excess water and stormwater. All discharges must satisfy permit limits and not cause violation of water quality standards. The quality of IMC's mine process water is good once suspended solids are allowed to settle. Table 4.6-2 presents the typical range of water quality characteristics contained in water discharged though permitted process water outfalls (NPDES). The Ona site would be permitted and monitored in a similar manner. Discharges from the IMC existing operations meet water quality standards. Data from these existing operations have been included to evaluate the expected impacts for the Ona site. No significant changes in the basic operation of mining and processing are proposed for these operations, thus similar quality water is expected to be discharged from the Ona site.

As shown on Figure 2.2-6, surface water discharges are proposed to flow into Horse and Brushy Creeks. Both Brushy and Horse Creek are Class III surface water bodies at the point of discharge. The quality of the discharges would be regulated by the NPDES effluent limitations. The proposed discharge points are located based on their proximity to the clay settling areas.

IMC’s proposed plan provides for discharges to be routed to Horse Creek (Discharge Outfalls 005 and 006) and Brushy Creek (Discharge Outfalls 007, 008, and 009). Table 4.6-2 presents the range of water quality characteristics expected in the discharges. A comparison of the water quality data presented in Section 3.6 indicates that the discharge into Horse Creek and Brushy Creek are expected to cause an increase in pH, conductivity, dissolved oxygen, and sulfate concentrations, and a decrease in total nitrogen concentration. The net result is not expected to cause violations of water quality standards in the receiving streams.

4.6.1.6 Sand and Clay Residuals Management

4.6.1.6.1 Conventional Settling (IMC’s Proposed Action)

No significant impacts to surface water quality are expected as a result of conventional disposal methods, which utilize clay settling areas to dispose of clay. These clay settling area impoundments not only serve to settle clay but also to clarify the recirculation water. If clay settling areas were not used, another treatment system would be required to produce water of similar quality. Dam failures, although a remote possibility since the implementation of state safety requirements (F.A.C. 62-672, 1999), pose a potential for significant degradation of water quality in the receiving water systems and damage to aquatic ecosystems. If a failure occurred, clays and contaminants associated with reagents used in the beneficiation process could enter Horse, Brushy, or Oak Creeks, or

Brady Branch. The water quality in these streams could be degraded as well as receiving streams downstream.

The potential radiological impacts to surface water and groundwater from phosphate mining have been studied extensively. Most of the studies evaluated radioactivity levels in areas near active phosphate mining operations, and compared those levels to radioactivity concentrations observed in areas where no mining was occurring or where no phosphate deposits exist. The studies concentrated primarily on Radium-226, the indicator radionuclide for the Uranium Series. They concluded that radiological impacts from phosphate mining and beneficiation operations are too small to observe or too minor to be considered a human health concern (USEPA, 1977) (see Section 4.17 for a more detailed discussion).

The only surface water release would be permitted releases during the mining operation, or as a non-point source following reclamation. These should not contain the mineral solids (the primary source of radioactivity is the mineral particles and not the water) so the clarified water that is discharged through the NPDES outlet should not pose a health risk.

IMC would construct, inspect, and maintain clay settling area dams in accordance with FDEP requirements specified in the F.A.C., Chapter 62-672 (1999), as well as all other applicable local, state and federal requirements.

Proper access and toe roads are constructed and maintained to facilitate adequate dam inspections. Grass on the dams is maintained to prevent erosion and is mowed to allow visibility for inspection. Supervision of safe freeboard levels is a requirement of all inspections. All findings are reported in compliance with Chapter 62-672 (F.A.C., 1999). IMC employs various levels of technical personnel to perform periodic inspections and maintenance of retaining dikes. All IMC dam inspectors and Geotechnical Engineers attend an annual refresher training to review and reinforce good inspection practices. Another tool in helping to evaluate the safe function of a dam is the installation and monitoring of piezometers to ensure the dams are operating as designed. As part of the permitting process for each dam, an Emergency Response Plan is prepared and submitted to the FDEP and local government.

4.6.1.7 Reclamation

4.6.1.7.1 <u>Conventional (IMC's Proposed Action)</u>

Following completion of reclamation, the number of wetland areas on the property would increase by about ten percent, and another three percent of the property would be reclaimed as recreational lakes. The two stream segments directly impacted by mining, Oak Creek south of SR 64 and the headwater tributary to Hickory Creek, would be reclaimed to eliminate the channelization and ditching that has occurred historically. Within

DRAFT

the portions of the drainage conveyance where a sinuous channel could develop, stacks of logs, snags, brush, and other energy absorption techniques would be used to reduce flow velocity to less than one foot per second on directly impacted stream segments. These techniques should retard natural erosional development and result in the desired sinuous and braided stream channel geometry. Such methods would minimize impacts to water quality from erosion in streams.

The final reclamation step would be re-routing stream flow into the reclaimed wetlands from the temporary alternate flow-way, and the subsequent regrading and revegetation of the then former temporary alternate flow way. The re-routing minimizes the potential for high levels of TSS/Turbidity, and is expected to result in a net water quality benefit when compared to the existing conditions. This benefit is increased water quality treatment capability because flow-through forested wetlands would replace ditched wetlands, thereby increasing retention time during low flow conditions.

It is expected that water quality would be maintained if not improved once the directly impacted stream segment begins flowing through the reclaimed system. Reclamation of the wetlands systems shown on Figure 2.2-12 would provide over 70 acres of inundated habitat and water quality treatment area.

Documentation of the ability of phosphate mine operators to reclaim floodplain wetlands is provided in a report entitled: “Evaluation of Constructed Wetlands on Phosphate Mined Lands in Florida” published in November 1997 by FIPR. The FIPR study observed that water quality within and flowing from reclaimed wetlands not only meets water quality standards, but also approximates conditions within natural wetlands and streams within three to five years following construction, or about the time when the BMP berm is proposed to be removed. Thus, rerouted and reclaimed streams are expected to continue to meet water quality standards throughout all phases of the project.

Radioactivity can be released from land reclaimed after mining has been completed. The Florida Department of Health BRC routinely monitors pre-mining and post-reclamation radioactivity levels in the central Florida phosphate district. This program monitors external gamma radiation, radon emissions from the land surface (radon flux), Radium-226 content in the soil, and ambient (outdoor) radon over the land surface. As part of that program, a study was conducted in 1988, which found that phosphate mining activities did not appear to affect surface water radioactivity concentrations (BRC, 1988).

All reclaimed land must meet water quality standards before it can be released from FDEP mine reclamation requirements. FIPR-funded research and water quality analyses illustrate that reclaimed land does not cause violations of water quality standards (IMC, 2002).

Therefore, the reclamation of the Ona site is not expected to cause adverse impacts to the water quality of the surface water systems that discharge from the property.

4.6.1.8 Product Transport

4.6.1.8.1 Rail (IMC's Proposed Action)

No significant impacts to the surface water quality are expected as a result of rail transport of mine product (wet phosphate rock). Water quality impacts are of concern if a spill occurred at a stream crossing. The spill of phosphate rock could result in increased suspended solids in the stream and a degradation of water quality could temporarily occur.

4.6.1.8.2 Truck Transport

No significant impacts to the surface water quality are expected from truck transport of mine product (wet phosphate rock). A lesser impact when compared to a rail spill at a stream crossing would be expected since the carrying capacity of a truck is less than that of rail cars.

4.6.2 IMC's Original Area to be Mined Alternative

4.6.2.1 Mining Methods, Matrix Processing, and Plant Siting

Surface water quality impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. While most of the floodplain associated with Horse Creek, West Fork Horse Creek and Brushy Creek would be undisturbed, additional wetland areas on the site would be mined and reclaimed. Under this alternative, 1,757 additional acres would be disturbed, of which 924 acres (approximately 53 percent) would be wetlands. These additional acres would extend the life of the mine approximately three years. The expected capture of rainfall in mined areas would be similar to the Proposed Action Alternative, since areas would be reclaimed as mining progresses. Therefore, the resulting water quality in the recirculation system and discharged from NPDES outfall would also be similar. With regard to duration, water quality changes in receiving streams from NPDES discharges would be expected to occur for approximately three additional years since the life of the mine would be extended.

The potential impacts to water quality from the transport of matrix would be similar to the Proposed Action Alternative with the exception of the number of stream crossings. Since areas that are proposed for preservation would be mined with this alternative, several stream crossings would be eliminated. Therefore, under this alternative, there would be a slight reduction in the potential for water quality impacts offsite from a pipeline break, since several stream beds would be removed.

Matrix processing would require water from both surface capture and groundwater withdrawals. Assuming no changes between alternatives in rate of mining, the commingled water quality of surface water, groundwater, and reagents of this alternative would be similar to the Proposed Action Alternative. The primary difference for this alternative is that the NPDES discharge to streams would occur over a longer time period corresponding to the additional mine life.

Plant siting would not be affected by this alternative since all three of the potential sites would be included in areas to be disturbed and all plant site runoff would be captured in the recirculation system. With regard to water quality at NPDES discharges, the discussion of water quality for the Proposed Action Alternative would be applicable for this alternative.

4.6.2.2 Sand and Clay Residuals Management

This alternative would accommodate the proposed locations for the sand and clay residuals management plan. However, assuming similar dam heights and settling area depths as the Proposed Action Alternative, approximately 1500 acres would be needed to dispose of the clay generated from the matrix mined to produce the additional 34 million tons of phosphate. Although dam failures are considered a remote possibility, there would be a slightly higher risk of impacts to stream water quality from a failure with this alternative since additional clay settling areas would be needed.

4.6.2.3 Reclamation

The general characteristics of the proposed reclamation could also be accommodated with this alternative. However, the plan would also include some additional areas of pasture and wetlands in the clay settling areas as well as typical reclamation of primarily upland communities in tailings/overburden fill areas. Water quality after reclamation would be similar to the Proposed Action Alternative.

4.6.3 Natural Systems Group Recommended Areas of Conservation Interest

4.6.3.1 Mining Methods, Matrix Processing, and Plant Siting

Surface water quality impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. Most of the floodplain associated with onsite streams, e.g. Horse Creek, West Fork Horse Creek and Brushy Creek would be undisturbed. In addition, various uplands and wetlands including the lower reach of Oak Creek would not be mined. Under this alternative, the disturbed area would decrease by 2,867 acres, of which 777 acres (approximately 27 percent) would be wetlands. Under this alternative, the disturbed area would decrease by 2,867 acres, of which 777 acres (approximately 27 percent) would be wetlands. This reduced mineable acreage would decrease the life of the mine approximately 4 years. The expected quantity from captured rainfall would be similar to the Proposed Action Alternative.

Therefore, the resulting water quality in the recirculation system and discharged from NPDES outfall would also be similar. With regard to duration, water quality changes in receiving streams from NPDES discharges would be expected to occur for approximately four less years since the life of the mine would be decreased.

The potential impacts to water quality from the transport of matrix would be similar to the Proposed Action Alternative including the number of stream crossings for access corridors.

Matrix processing would require water from both surface capture and groundwater withdrawals. Assuming that the rate of mining was the same for each alternative, the commingled water quality of surface water, groundwater, and reagents of this alternative would be similar to the Proposed Action Alternative. The primary difference for this alternative is that the NPDES discharge to streams would occur over a shorter time period as a result of reduced beneficiation for the decreased phosphate production.

Plant siting would be affected by this alternative since portions of the Proposed Action Alternative and Plant Site #2 would be included in areas to be preserved. However , water quality of streams would not be affected since all plant site runoff would be captured in the mine recirculation system. With regard to water quality at NPDES discharges, the discussion of water quality for the Proposed Action Alternative would be applicable for this alternative.

4.6.3.2 Sand and Clay Residuals Management

This alternative would not accommodate the proposed locations for the sand and clay residuals management plan, since many of the proposed settling areas would be affected by the preservation acreage. However, approximately 800 acres less would be needed to dispose of the clay generated from the matrix mined based on a reduction of 18 million tons of phosphate production. Although dam failures are considered a remote possibility, there may be slightly less risk of water quality impacts from a failure with this alternative since fewer clay settling areas would be needed. However, this advantage may be offset by less efficient clay settling areas that may require more dam length for the equivalent storage capacity because of interference with preservation areas.

4.6.3.3 Reclamation

The general characteristics of the proposed reclamation could not be accommodated with this alternative. Areas of clay settling would not be placed where they are presently planned. The plan for this alternative would contain less areas of pasture and wetlands in the clay settling areas as well as less reclamation of uplands in tailings/overburden fill areas because of the reduced mining acreage. Several proposed lakes would need to be relocated since their present location would be in conflict with preservation areas. After reclamation, the water quality in streams and lakes would be similar the Proposed Action Alternative.

4.6.4 No USACE Jurisdictional Wetlands Impacts Alternative

To avoid any impacts to USACE jurisdictional wetlands, no stream crossings could occur. Therefore, only those areas that can be accessed by draglines currently in operation at the Fort Green Mine would be mined. If the Section 404 Dredge and Fill Permit Application submitted to the USACE is denied, the state and county permits may be modified to allow mining of approximately 1,122 acres of uplands on the western side of Horse Creek (five percent of the total acreage).

The No USACE Jurisdictional Wetlands Impacts Alternative would result in a maximum of 1,122 acres of surface water capture area. This would not be expected to impact water quality in existing streams. Other impacts for matrix transport, matrix processing, plant site, and water management would no longer apply to this alternative. The impacts from sand and clay residuals management and reclamation would be limited to the area of mining, which would only be approximately seven percent of the IMC proposed action acreage. Therefore, no significant impacts would be expected from this alternative assuming environmental protection measures proposed for the proposed action were implemented. Impacts to the remainder of the site left undisturbed would be similar to those described for the No Action Alternative in Section 4.6.3.

4.6.5 No Action Alternative

The future land use of the Ona site and surrounding areas would determine the impacts to surface water quality. No significant changes would occur if the property remains in the current land uses. However, based on the 2000 census as described in Section 3.12, more population growth occurred during the 1990's in Hardee County than had been forecasted. Modest growth is expected in existing communities such as Ona. As a result, residential and home/agri-business would be expected in the vicinity of roads in the mine area. Such growth would typically result in increased pollutant loading rates to streams as a result of urbanization and agricultural activities. Since the urbanization density is expected to be low, a slight increase in pollutant loads of parameters such as suspended solids, nutrients, and pesticides would be anticipated. However, if areas are developed as for intensive agricultural use, loading factors can increase significantly and adversely affect water quality. A discussion of the changes in water quality that have occurred as a result of agricultural land use is included in Section 4.26.6, cumulative water quality impacts. This discussion presents the changes in loading rates for nutrients and suspended solids resulting from agricultural activity. These increases have resulted in FDEP giving the lower portion of Horse Creek a poorer water quality stream ranking than the upper portion of the basin, which is presently being mined for phosphate in some areas.

DRAFT

4.7 HYDROGEOLOGY, INCLUDING GROUNDWATER QUALITY

4.7.1 Proposed Action Alternative

4.7.1.1 Mining Methods

4.7.1.1.1 Dragline Mining (IMC's Proposed Action)

A. Quantity

Dragline mining causes impacts to the SAS from dewatering of the mine pits in order to extract the phosphatic matrix. The matrix underlies the surficial sands (overburden), which are stripped from the top of the matrix and temporarily stockpiled adjacent to the mine cut. Groundwater contained within the overburden would then flow into the mine pits and would need to be removed. As a result of these activities, shallow aquifer water levels would be lowered in the vicinity of the mine cuts. The distance these levels would be lowered and the areas that would be affected are related to the aquifer hydraulic properties, the geometry of the mine cut, and the length of time needed for mine pit dewatering.

During mining, the water level in the proposed mine pit would be kept at the bottom of the mine pit to improve the efficiency of the mining operation. A ditch excavated in the bedclay near the middle of each mine cut would direct any water that drains into the mine pit from the cast overburden or the adjacent unmined overburden to a sump, from which it would be pumped into the mine water recirculation system. Dewatering wells may be installed immediately adjacent to the upgradient side of each mine cut to assist in draining the overburden and any permeable matrix prior to mining. The water budget for the mine assumes that all of the drainable water in the overburden and all of the water in the matrix within the limits of the mine pits would enter the mine recirculation system. A specific yield of 0.1 was used to estimate the quantity of water entering the mine water recirculation system from the overburden and a moisture content of 23.3 percent was used to estimate the quantity of water entering the recirculation system from the matrix. The specific yield of 0.1 was selected based on a review of the aquifer performance test results reported for the site vicinity by the SWFWMD. For the proposed production of 2 to 6 million tons of phosphate product per year, the estimated average annual quantity of water entering the recirculation system from overburden drainage is 2,100 acre-ft/yr.

A BMP recharge ditch and berm or a recharge well system would be constructed to maintain groundwater levels between existing open mine cuts and adjacent unmined wetlands and offsite properties. To minimize seepage from the recharge system into the open pit, overburden would be backcast against the open face during the mining process. This would assist in retarding the groundwater seepage into the pit. The groundwater outflow would be maintained adjacent to protected areas by keeping a high level of water in the ditch portion of the BMP system, constructed parallel to these areas. In addition, recharge wells or other artificial hydration methods that are constructed in conjunction with, or as an alternate to, the BMP system can be used. Water from the ditch or recharge well system would recharge the SAS and would prevent drawdown of the water table at an adjacent undisturbed or protected area until the mined area is reclaimed. A drawing showing a typical design of a recharge ditch and berm system, including the recharge well alternate is presented in Figure 4.5-1. Water for the recharge system would come from the mine water recirculation system or from groundwater withdrawals if recirculation water were not available. Recharge systems would be installed and operated prior to initiating any dewatering wells or mining within the setback distances from property boundaries, or applicable wetlands. The recharge systems would be maintained until the mined areas are backfilled during the reclamation process and the water table re-established. For sand tailings fill areas, backfilling could be completed within about 4 years after mining. For areas required for waste clay disposal, backfilling would occur when the dam is constructed and the water table re-established.

The elevation of the water table before and after drainage for a typical mine pit is shown in Figure 4.7-1 for conditions with and without a recharge canal. Note that these elevations are only applicable as long as the mine pit is dewatered. The mine cut would fill with water as soon as the active mining has moved far enough away so that the water in the pit does not affect the mining conditions.

Based on the range of leakance values provided in Metz (1995), recharge from the SAS to the IAS at the project site prior to mining is estimated to be between 0.2 and 2.0 in/yr. As documented by Lewelling and Wylie (1993), water pressure in the SAS at the top of the IAS confining layer, even beneath clay settling areas, is not expected to change significantly as a result of mining and reclamation. As illustrated in Figure 4.7-2, water level monitoring at the Fort Green Mine has shown that the mining does not impact the IAS. Figure 4.7-2 demonstrates that the potentiometric surface of the IAS fluctuates independently of the water level in the SAS during monitoring through mining and reclamation. Well cluster MW-3, MW-5 and MW-8 represent water levels measured in Hardee County north of SR 62 at the Fort Green Mine site. Well cluster MW-5 shows an area that was not mined, to compare with MW-3 and MW-8, located in the area that was mined. Well clusters MW-3 and MW-8 represent an area with pre-mining and post-mining conditions during the five-year period, respectively. Based on the results of this monitoring at the Fort Green Mine site, and similarities in the aquifer systems, leakage through the confining layer (i.e., recharge to the IAS from the SAS) is expected to remain in the range of 0.2 to 2.0 in/yr.

B. <u>Quality</u>

Extensive water quality analyses of IMC's and other mining companies' mine process water has demonstrated compliance with primary drinking water standards. Based upon

DRAFT

these data, FDEP has concluded that mine process water is not a threat to groundwater quality and has exempted phosphate mines from the requirement to conduct groundwater quality monitoring. Section 4.6.1 includes a description of the water in the ditch and berm system, which encompasses all the mining areas. Included in that section is Table 4.6-1, which shows that water quality is generally good based on sampling in these systems at other mines.

Prior to mining, IMC's policy is to sample and inventory neighboring wells located within 1,200 feet of a mining area. Water quality of the well would be characterized at that time. This effort is voluntary and is done at no cost to the neighbor. Results of the analyses are provided to the resident. This pre-mining water quality is used for reference should any concerns arise during mining and reclamation. Additionally, IMC would continue to monitor on-site water quality during the life of the mine. Any changes in water quality would first be noticed in these on-site wells.

4.7.1.2 Matrix Transport

4.7.1.2.1 <u>Slurry Matrix Transport (IMC's Proposed Action)</u>

The slurry matrix produced during mining operations would initially be transported by slurry pipeline to the Fort Green Southern Washer and then transferred to the Fort Green Beneficiation Plant. At a later time, when conditions warrant, the matrix would be transported by slurry pipeline to the Ona Beneficiation Plant. The access corridors shown on Figure 2.2-1 are located to provide for the mine transportation needs, which include ore (matrix) transport.

A. <u>Quantity</u>

The UFA and recirculation system would be used to provide approximately 3.5 mgd for pump seal water for the matrix pipeline. The estimated average annual amount of water entering the recirculation system with the matrix is eight mgd. The location of wells used for pump seal water, when wells are used, would change as pipelines are moved to accommodate mining. However, in these areas of groundwater use, the withdrawal rate would be relatively small and distributed over the length of the pipeline. Therefore, no significant impact on groundwater levels is expected from withdrawals for pump seal water needs. The potential impact on the UFA from the sealing water wells was included in the analysis the SWFWMD performed in granting the IMC WUP, which includes the Ona Mine.

B. <u>Quality</u>

Matrix slurry transport is not expected to cause any significant changes in groundwater quality.

4.7.1.2.2 Conveyor Transport

A. Quantity

The conveyor option would have less potential for groundwater quantity impacts than the slurry pipeline option since the matrix transport would not utilize pump seal water. However, since the pump seal water does enter the mine recirculation system, with the conveyor option additional pumping would be needed from the production wells during periods of low rainfall. Therefore, because the pump seal quantities required are relatively small and distributed along the entire pipeline, the differences in impacts associated with this option would be similar to the slurry pipeline option.

B. Quality

Conveyor transport is not expected to cause any significant changes in groundwater quality.

4.7.1.3 Matrix Processing

4.7.1.3.1 Conventional Beneficiation (IMC's Proposed Action)

A. Quantity

After the matrix is mined and transported to the plant area, it is processed (beneficiated) to obtain a saleable product. Wet processing beneficiation is presently employed throughout the central Florida Phosphate district. This system is most suitably adapted to the pipeline system of matrix transportation. During the first five to eight years of mining the Ona site, IMC would continue to utilize the Fort Green Beneficiation Plant, which is capable of producing 5.5± million tons per year of phosphate rock product. Thereafter, the proposed Ona Beneficiation Plant would become operational, producing 6± million tons per year of phosphate rock product. Both plants would utilize the wet process beneficiation method.

The beneficiation process would utilize recirculation water, which would be supplemented by groundwater. The water balance model described in Section 4.5 estimated the average annual groundwater requirement to be 4.61 mgd, as indicated in Table 2.2-5. The three major sources of groundwater from the site are the SAS, the IAS, and the UFA. These three water-bearing zones have different physical characteristics and water chemical properties. The SAS is of low yield and is typically used for local irrigation, limited domestic use or dewatering projects (SWFWMD, 2000).

The IAS is a more permeable zone than the SAS but the typical yield from this system varies throughout the water-bearing zone. The IAS is considered a leaky-confined aquifer, and well yields typically range from 50 to 500 gpm (Wilson, 1977). Uses of the IAS include public water supply, domestic use, and irrigation (SWFWMD, 2000). The IAS includes the water-bearing unit between the SAS and the underlying UFA. Hydraulic properties of the IAS are highly variable over short distances indicating lithologic heterogeneity (Yobbi, 1996). Based on available hydrogeologic cross-sections, there are indications that the IAS within the vicinity of Ona site includes clay lenses that may result in partitioning of this aquifer into independent layers (Lewelling and Wylie, 1993). Therefore, the IAS may not be used as a reliable source of process water.

The UFA is the principal source of water in the SWFWMD (SWFWMD, 2000). Wells developed in the UFA yield large quantities of water, often in excess of 1,000 gpm. IMC proposes to install three production wells in the UFA (two for use, and one for standby) at the Ona site as permitted under the existing IMC WUP #2011400.008. These wells would be used for supplemental water to the recirculation system. Any water that is needed in excess of that available through the wells at Ona would be supplied by wells at the Fort Green Mine. The WUP sets limits on each well and total overall IMC usage, allowing IMC to transfer water between mines as needed.

As a requirement of IMC's WUP #2011400, the aquifer system performance test data were evaluated in a report entitled "Evaluation of Hardee County Pumping Test - IMC Consolidated WUP #2011400" (Schreuder, 1997). This report concluded that the aquifer system parameters used in the impact evaluation for the WUP were appropriate and the impact analysis was reasonable.

Since the Ona site was to be a new water use location, the second evaluation approach was to construct a groundwater flow model to specifically evaluate the Ona site pumping impact. This second model utilized the same aquifer system parameters as the SWFMWD regional model. The model results show no impact to the SAS, a maximum drawdown of 1.3 feet in the IAS, and a seven-foot maximum drawdown in the UFA. Figure 4.7-3 shows the model-predicted extent of drawdown in the IAS as compared to the mine site boundary. Figure 4.7-4 shows the model-predicted extent of the UFA drawdown as compared to the mine site boundary.

IMC's demand for water has trended downward during the past decade due to the new water reuse and conservation techniques that have been developed at its mines in Hillsborough and Polk Counties. Although additional incremental reductions beyond those achieved to date are not expected, when expressed on a per unit of production basis, the IMC proposed Ona Beneficiation Plant would be considered as water-efficient as any other mining operation in the region.

Further, the Ona site development simply represents a shift in the location of water demand rather than a new, incremental demand upon the region's water resources. This is because phosphate rock production from the Ona site would partially offset the loss of production because of the closing of IMC's Clear Springs, Noralyn, Phosphoria, and Payne Creek Mines during the past four years, and the Fort Green Mine within the next eight to ten years. Thus, even when the proposed Ona Beneficiation Plant is operating at its proposed six million tons per year capacity, groundwater demand by IMC operations would not increase on a region-wide basis from current levels.

Based on the monthly water budget analyses for the mine life, the average annual water requirements for the Ona site vary between 0 mgd to a high of 17.46 mgd and would depend upon the amount of rainfall. The modeled monthly water budget for the Ona site is presented in Table 4.5-3. The permitted values are an average of six mgd and a maximum of eight mgd for two production wells. If the capacity of the site-specific wells were exceeded, IMC has additional water availability from other mines that could be used to make up the difference. The permitted levels for all the IMC facilities provide adequate capacity to meet the needs of the Ona site.

B. Quality

As discussed in the quantity section, the UFA is the principal source of water in the SWFWMD (SWFWMD, 2000). In the Ona site area, the FAS generally consists of two layers: the UFA that contains fresh water and the LFA that contains highly mineralized water (Metz, 1996). Water quality and quantity in the UFA is generally good. Sulfate concentration in the UFA within the site area range from 30 to 60 milligrams per liter (mg/l) and total dissolved solid concentration is between 200 to 300 mg/l (IMC, 2002). Water in the LFA is generally sufficient in quantity but low in quality. The water quality of the LFA is brackish or highly mineralized in the area of the Ona site.

No significant changes in the water quality of aquifers are expected as a result of the groundwater withdrawals for water at the Ona site.

4.7.1.4 Plant Siting

4.7.1.4.1 IMC's Proposed Plant Location

A. Quantity

The IMC proposed plant site would occupy approximately 150 acres, which is less than one percent of the Ona site. The impervious surface of the plant would result in an increase in surface runoff from the plant site. However, the SWFWMD has determined that the Ona site is located in a region with no recharge to very little recharge from the SAS (water table) into the IAS and from the IAS into the FAS. Therefore, no significant impact would occur to the groundwater quantity of these aquifers as a result of the plant site.

B. Quality

As discussed in Section 4.9.1.2, the plant would include properly-designed above grade mineral acid and fuel storage tanks and designated hazardous waste accumulation areas, all with secondary containment. Therefore, no releases of hazardous waste or reagents are expected into the SAS as a result of the plant activities.

DRAFT

4.7.1.4.2 Other Plant Locations

The two other plant site locations would have a similar lack of significant impact to groundwater quantity and quality as described for the proposed action.

4.7.1.5 Water Management

4.7.1.5.1 Process Water Sources

A. Groundwater Withdrawal (IMC's Proposed Action)

Quantity

Impacts from the withdrawal from the three proposed production wells at the Ona site included under the existing IMC WUP #2011400.08 have been discussed under the Matrix Processing discussion. When a plant complex is built on-site, there would be a requirement for three additional wells; one for potable and sanitary purposes (24,000 gpd), one well for utility water purposes (75,000 gpd), and one well for fire-fighting purposes. These three additional wells would be added to the existing WUP.

Based on the results of the modeling for the proposed production wells, the on-site wells for potable, sanitary, utility, and fire-fighting purposes (less than 100,000 gpd total), are not expected to have a measurable impact on the surrounding water users.

Quality

The additional pumping needs are not expected to cause any significant impacts to the groundwater quality of the aquifers.

B. Surface Water Capture (IMC's Proposed Action)

Significant impacts on groundwater quantity or quality are not expected to result from capturing rainfall runoff in the mine-recirculation system.

4.7.1.5.2 Discharge to Surface Water

Significant impacts on groundwater quantity or quality are not expected to result from discharging excess water from the mine-recirculation system to surface water streams. Discharges would only be made during periods of excess rainfall, when the storage capacity of the mine recirculation system is exceeded. Groundwater pumping would be utilized during dry periods when storage capacity has reached a minimum threshold within the recirculation system. In addition, since IMC's mine process water meets FDEP primary groundwater standards, no adverse groundwater quality impacts are expected.

4.7.1.6 Sand and Clay Residuals Management

4.7.1.6.1 Conventional Settling (IMC's Proposed Action)

A. Quantity

Essentially all of the water removed from the overburden and matrix would be returned to the SAS as water entrained in the sand tailings or waste clay, or would be used to refill the voids in the overburden. For the proposed production of 2 to 6 million tons per year, the estimated average annual quantity of water entrained within the sand tailings is 3,688 acre-ft/yr, entrained within the waste clay is 30,059 acre-ft/yr, and used to refill the overburden is 4,051 acre-ft/yr. For this disposal method, the waste sand and clays would be disposed of in separate areas prepared from the land that has already been mined. Since the permeability of the clay would be lower than the surrounding area, the water levels would be higher in the clay settling areas than in the surrounding SAS. However, the permeability in the clay settling area would be higher than the underlying confining beds, which separates the SAS from the IAS and FAS. Therefore, no reduction in recharge to the deep aquifer would be expected in the areas of the clay settling areas.

The recharge to the SAS in sand tailings areas would be expected to be slightly higher than natural conditions. The water levels in the SAS in these areas would be expected to be similar to the existing conditions as the areas re-establish. The FAS or IAS would not experience significant changes as a result of the waste disposal of sand and clay.

B. Quality

Data have been collected from clay and sand tailings process waste streams and are presented in Tables 4.6-4 and 4.6-5. These data indicate that the process water streams are generally of good quality. The tailings water stream is "contact process generated" wastewater discharged directly from the flotation circuits and support the conclusion that the levels of the reagents used in the beneficiation process are significantly reduced before entering the recirculation system. The potential radiological impacts to surface water and groundwater from phosphate mining have been studied extensively and are described in Section 4.6.1.6.1. Based on the data presented in this section and previous studies on radiological impacts, impacts to the groundwater quality of the SAS are not expected as a result of the waste disposal of sand and clay.

4.7.1.7 Reclamation

4.7.1.7.1 <u>Conventional (IMC's Proposed Action)</u>

A. <u>Quantity</u>

The approximately 3,685 acres at the Ona site that are reclaimed from clay settling areas would have a surface soil with less permeability than the existing soils, whereas, the land reclaimed from overburden-capped sand tailings would have permeability similar to the pre-mine condition at the site. Almost immediately after mining, water elevations within the mine cut would begin to recover from the dewatering, which occurred during mining. There is a potential for water elevations in the mine cuts to remain below historical water table elevations until contouring of earth during reclamation. For this reason, IMC is proposing to continue to operate recharge ditches at least until contouring is completed during reclamation.

Table 4.7-1 contains a comparison of the groundwater outflow from the site for the pre-mining and post-reclamation conditions. The results of the analyses indicate that the largest reduction in groundwater outflow would occur in Hickory Creek, resulting from the creation of a lake, which would increase the ET for the basin after mining. Groundwater outflow would occur to all post-reclamation wetlands. At the end of the summer wet season, and whenever groundwater outflow exceeds riparian wetland ET, there would be visible seeps at the edges of these wetlands. The groundwater outflow and baseflow are both expected to remain relatively unchanged as a result of mining and reclamation.

No long-term changes are expected in the vertical groundwater flow at the site as a result of the proposed mining and reclamation of the property. In areas of reclamation with overburden and sand tailings fill, the vertical hydraulic conductivity would be similar to pre-mining conditions, therefore, the vertical hydraulic conductivity of the confining beds would determine the rate of recharge, which is approximately one in/yr. In the clay settling areas, as the clay continues to consolidate, the vertical hydraulic conductivity continues to decrease. However, the vertical hydraulic conductivity at the end of consolidation is approximately 3.4 in/yr, which is higher than the confining beds (IMC, 2002). Therefore, even at the end of consolidation of the clay settling areas, the confining beds would determine the vertical movement of water (i.e. the recharge rate), which is approximately one in/yr. Therefore, recharge to underlying aquifer systems is not expected to change significantly as a result of mining and reclamation.

The impacts to the mining areas are limited due to FDEP rules. If a mine cut is not within the footprint of a clay settling area, then reclamation must be completed within two years from the end of mining use. Typically, mine cuts along property boundaries or wetlands

DRAFT

are given higher priority for reclamation. This may include using bulldozers to contour overburden piles adjacent to a wetland or riverine system, accelerated placement of sand tailings, or other measures. This would minimize the period of time that wetlands and off-site areas have to be protected from the potential impacts of mining activities.

B. Quality

In the short-term, impacts to the SAS would be similar to those discussed in Section 4.7.1.6. In the long-term, no significant impacts or changes to groundwater quality would be expected from the proposed reclamation techniques.

4.7.1.8 Product Transport

4.7.1.8.1 Rail (IMC's Proposed Action)

There would be no significant impact on groundwater quantity or quality resulting from a spill during rail transport.

4.7.1.8.2 Truck Transport

There would be no significant impact on groundwater quantity or quality resulting from a spill during truck transport.

4.7.2 IMC's Original Area to be Mined Alternative

4.7.2.1 Mining Methods, Matrix Processing, and Plant Siting

A. Quantity

Groundwater quantity impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. While most of the floodplain associated with Horse Creek, West Fork Horse Creek and Brushy Creek would be undisturbed, additional upland and wetland areas on the site would be mined and reclaimed. Under this alternative, 1,757 additional acres would be disturbed, of which 924 acres (approximately 53 percent) would be wetlands. These additional acres would extend the life of the mine approximately three years. As a result of these activities, additional areas of the site would have lowered shallow aquifer water levels. However, the mining of the additional areas for this alternative is not expected to change the leakage through the confining bed.

With this alternative, additional overburden drainage would also occur into the mine recirculation system from the added areas. Since the configuration of mined areas would be more continuous, fewer rim ditches around wetlands would be needed. This would result in a corresponding reduction in groundwater outflow needs to maintain recharge ditches around protected areas, since there would be fewer wetlands to protect. The water to recharge the ditches is supplied from the mine recirculation system or from groundwater withdrawals, therefore, a slight reduction in the water needs of these sources would be expected.

Assuming the rate of mining would be the same as the Proposed Action Alternative, the groundwater quantity impacts from the transport of matrix would be similar. The primary difference between the alternatives is that pump seal water for matrix transport would be needed for an additional three years corresponding to the longer mine life. However, since the withdrawal rate for the pump seal water would be relatively small and distributed over the length of the pipeline, no significant impact on groundwater levels is expected from the additional pumping needs.

Matrix processing would require water from both surface capture and groundwater withdrawals. Assuming the rate of mining would be the same as the Proposed Action Alternative, the water requirements would be similar. The primary difference is that the groundwater demand could occur for approximately three additional years. However, if the Ona Beneficiation Plant was meeting IMC's phosphate production needs, groundwater demand by IMC operations would not increase on a regional-wide basis during this extended period.

Plant siting would not be affected by this alternative since all three of the potential sites would be included in areas to be disturbed and are in a region of no recharge to very little recharge. With regard to water use, the water supply for the plant site personnel, utility purposes, and fire protection needs would be similar to the Proposed Action Alternative, except for an extended time period to accommodate the additional mine life.

B. <u>Quality</u>

Groundwater quality impacts from mining, martrix processing, and plant siting would be similar to the Proposed Action Alternative.

4.7.2.2 Sand and Clay Residuals Management

This alternative would accommodate the proposed locations for the sand and clay residuals management plan. However, assuming similar dam heights and settling area depths as the Proposed Action Alternative, approximately 1500 acres would be needed to dispose of the clay generated from the matrix mined to produce the additional 34 million tons of phosphate. The matrix would also generate additional sand tailings and overburden. This would result in additional water entrained in waste clay, sand tailings, and overburden during the mining activities. The effect of the clay settling and sand tailing areas on the SAS would be similar to the Proposed Action Alternative impacts as discussed in Section 4.7.1.6.1.

A. <u>Quality</u>

Based on data provided in Section 4.7.1.6.1, impacts to groundwater quality are not expected as a result of the waste disposal of the additional sand and clay.

4.7.2.3 Reclamation

The reclamation plan for the Proposed Action Alternative could be accommodated with this alternative. However, the plan would also include areas of pasture, wetlands, and other upland communities to reclaim the additional sand and clay residuals. The characteristics of these areas are described in Section 4.7.1.7.1 and would be similar for both alternatives.

A. Quality

In the short-term, impacts to the SAS would be similar to those discussed in Section 4.7.1.6. In the long-term, no significant impacts or changes to groundwater quality would be expected from the additional reclamation areas utilizing the proposed reclamation techniques.

4.7.3 Natural Systems Group Recommended Areas of Conservation Interest

4.7.3.1 Mining Methods, Matrix Processing, and Plant Siting

A. Quantity

Groundwater quantity impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. Most of the floodplain associated with onsite streams, e.g. Horse Creek, West Fork Horse Creek and Brushy Creek would be undisturbed. In addition, various uplands and wetlands including the lower reach of Oak Creek would not be mined. Under this alternative, the disturbed area would decrease by 2,867 acres, of which 777 acres (approximately 27 percent) would be wetlands. This reduced mineable acreage would decrease the life of the mine approximately 4 years. As a result of these decreased activities, a reduced area of the site would have lowered shallow aquifer water levels. However, the mining of a reduced area for this alternative is not expected to change the leakage through the confining bed.

Reduced overburden drainage would also occur which would supply less water into the mine recirculation system. Since the configuration of mined areas would be less continuous, additional rim ditches around wetlands would be needed. This would result in a corresponding increase in groundwater outflow needs to maintain recharge ditches around protected areas, since there would be more wetlands to protect. The water to recharge the ditches is supplied from the mine recirculation system or from groundwater withdrawals, therefore, a slight increase in the water needs from these sources would be expected.

Assuming the rate of mining would be the same as the Proposed Action Alternative, the groundwater quantity impacts from the transport of matrix would be similar. The primary difference between the alternatives is that pump seal water for matrix transport would be needed for approximately four less years corresponding to the shorter mine life. However, since the withdrawal rate for the pump seal water would be relatively small and distributed over the length of the pipeline, no significant change on groundwater levels is expected from the reduced pumping needs.

Matrix processing would require water from both surface capture and groundwater withdrawals. Assuming the rate of mining would be the same as the Proposed Action Alternative, the water requirements would be similar. The primary difference is that the groundwater demand could occur for approximately four years less. However, if an IMC Beneficiation Plant was meeting IMC's phosphate production needs, groundwater demand by IMC operations would not decrease on a regional-wide basis after the Ona mining was completed.

Plant siting would be affected by this alternative since portions of the Proposed Action Alternative and Plant Site #2 would be included in areas to be preserved. However, since all three of the sites are in a region of no recharge to very little recharge, the selection of any of the sites would not change the leakage through the confining bed.

B. Quality

Groundwater quality impacts from mining, martrix processing, and plant siting would be similar to the Proposed Action Alternative.

4.7.3.2 Sand and Clay Residuals Management

This alternative would not accommodate the proposed locations for the sand and clay residuals management plan, since many of the proposed settling areas would be affected by the preservation acreage. However, approximately 800 acres less would be needed to dispose of the clay generated from the matrix mined based on a reduction of 18 million tons of phosphate production. The matrix would also generate less sand tailings and overburden. This would result in less water entrained in waste clay, sand tailings, and overburden during the mining activities. The effect of the clay settling and sand tailing areas on the SAS would be similar to the Proposed Action Alternative impacts as discussed in Section 4.7.1.6.1.

A. Quality

Based on data provided in Section 4.7.1.6.1, impacts to the groundwater quality are not expected as a result of the waste disposal of the sand and clay.

4.7.3.3 Reclamation

The general characteristics of the proposed reclamation could not be accommodated with this alternative. Areas of clay settling would not be placed where they are presently planned. The plan for this alternative would contain less areas of pasture and wetlands in the clay settling areas as well as less reclamation of uplands in tailings/overburden fill areas because of the reduced mining acreage. Several proposed lakes would need to be relocated since their present location would be in conflict with preservation areas. However, the plan would also include reduced areas of pasture, wetlands, and other upland communities to reclaim less sand and clay residuals. The characteristics of these areas are described in Section 4.7.1.7.1 and would be similar for both alternatives.

A. Quality

In the short-term, impacts to the SAS would be similar to those discussed in Section 4.7.1.6. In the long-term, no significant impacts or changes to groundwater quality would be expected from the fewer reclamation areas utilizing the proposed reclamation techniques.

4.7.4 No USACE Jurisdictional Wetlands Impacts Alternatives

To avoid impacts to USACE wetlands, approximately 1,122 acres of uplands on the western side of Horse Creek (five percent of the total acreage) would be the only area mined.

The No USACE Jurisdictional Wetlands Impacts Alternative would result in a maximum of 1,122 acres of dewatering for mining. This area of dewatering would not be expected to impact streams or adjacent properties if recharge ditch and berm systems as described for the proposed action were implemented. Other impacts for matrix transport, matrix processing, plant site, and water management would no longer apply to this alternative. The impacts from sand and clay residuals management and reclamation would be limited to the area of mining, which would only be approximately seven percent of the IMC proposed action acreage. Therefore, no significant impacts to groundwater quantity or quality would be expected from this alternative. Impacts to the remainder of the site left undisturbed would be similar to those described for the No Action Alternative in Section 4.7.3.

4.7.5 No Action Alternative

The future land use of the Ona site and surrounding areas would determine the impacts to groundwater quantity and quality. No significant changes would occur if the property remains in the current land uses. However, based on the 2000 census as described in Section 3.12, more population growth occurred during the 1990's in Hardee County than had been forecasted. Modest growth is expected in existing communities such as Ona. As a result, residential and home/agri-business would be expected in the vicinity of roads in the mine area. Such growth would typically result in increased aquifer withdrawals for domestic use and for agricultural purposes. Since the urbanization density is expected to be low, a slight increase in aquifer withdrawals would likely result from additional population. Since the area would be primarily rural, septic tanks would likely be used for domestic wastewater, which would increase the potential for slight impacts to the SAS water quality. However, if agricultural interests continue to expand, the resulting drawdowns could be significantly more than the present levels. Additional pumping would not be expected to have a significant effect on groundwater quality. However, an increase in intensive agricultural activities typically increases water quality concentrations, e.g. nutrient levels in the SAS from the application of fertilizer and conductivity levels from deep aquifer pumping.

4.8 TOPOGRAPHY AND SOILS

Section 3.8.2 presents the description of each soil type found at the Ona site. The soil information presented is a synopsis of the detailed information found in the Hardee County Soil Survey (SCS, 1984). The majority of the soils within the Ona site share the same general description of being poorly drained and nearly level. Typically, the surface layer is fine sand with varying degrees of organic matter or muck in the top several inches. In some instances, a discontinuous cemented sand or clay layer is located near the surface, and acts as an semi-impervious layer to water permeability, causing standing water or saturated soil conditions for short durations during the rainy season. Based on the soil descriptions, none of the soils have a discreet cemented soil horizon. During mining, the layer of soil above the ore or matrix is cast aside as overburden into the mine cut or on natural ground beside the cut. The ore is separated during the beneficiation process into phosphate rock, clean sand and clay, which is actually a mixture of fine soil materials including a majority of clay minerals.

As discussed in Section 3.8.2.2, there are no prime farmland soils in Hardee County (SCS, 1984; Richards, 2002). However, any land in Hardee County that is in citrus production is considered unique farmland (Richards, 2002). There are 209.2 acres at the Ona site that are currently in citrus production and would be converted to nonagricultural use under the proposed action alternative.

To comply with the FPPA, a Farmland Conversion Impact Rating form (AD-1006) was completed in consultation with the NRCS (Henderson, 2002; Appendix C). A Land Evaluation/Site Assessment was used to determine the relative value of the 209.2 acres of citrus grove that would be converted under the proposed action alternative. The site was given a total value of 121 points out of a possible 260 points. The FPPA recommends that sites receiving scores of less than 160 points be given minimal levels of protection and no additional sites need to be evaluated. Therefore, the proposed action alternative complies with the FPPA. Because there is no federal action under the No Action Alternative, there is no requirement for FPPA compliance.

The mining and beneficiation of phosphate ore have been evaluated for their potential to release radioactive materials into the environment via several pathways (IMC, 2002):

- The slurrying of the matrix and the use of clay settling ponds can increase the potential for releases of radioactivity to surface waters and for the seepage of radioactivity to groundwaters due to the physical transport of the phosphate particles.
- The use of surface mining to expose the elevated radioactivity matrix can increase the potential for the release of radon and particulate radioactivity from the open mine cut.
- The elevated radioactivity associated with reclaimed lands can result in releases of additional radon from the surface of these lands.

In Section 3.8, Table 3.8-3 summarizes the typical concentrations of Radium-226 in phosphate ore and in various products and by-products of the beneficiation process (USEPA, 1975). The concentrations can vary from those listed, but these levels are typical for central Florida. These concentrations indicate that most of the Radium-226 tends to remain with the rock and the clay wastes. The radium also tends to remain bound to the particles in these materials and does not dissolve readily.

4.8.1 Proposed Action Alternative

4.8.1.1 Mining Methods

4.8.1.1.1 <u>Dragline Mining (IMC's Proposed Action)</u>

None of the soil types listed in Table 3.8-1 present a limitation to using conventional central Florida surface mining techniques to recover the phosphate ore, which lies beneath these soils. IMC has mined in each of these soil types in the past without experiencing unusual difficulties.

The steps IMC would take to control water soil erosion are partially described in Section 4.6. Mining operations are not allowed to permanently adversely impact surface or groundwater of the state or in the state. The water regime is regulated by the federal and state laws, rules, and permits administered by FDEP and the SFWMD. Below is a description of techniques used throughout the mining process to minimize the loss of soils into off-site areas.

Before site preparation and construction activities are started, the area proposed for disturbance is isolated from any streams, tributaries, wetlands, waterbodies, drainage features, or watercourses that are not designated for mining. This is accomplished by the construction of a ditch and berm system that separates the area to be disturbed from the protected areas. Any soil erosion resulting from water run off during site preparation, construction activities, mining and reclamation operations would be contained within the area encompassed by the ditch and berm system. A diagram of the ditch and berm system is shown in Figure 4.5-1. Any turbid water flow would be collected and directed to clay settling areas or back into the internal recirculation water system where it would be allowed to clarify. Any discharge from these clarification systems must pass through federal, state, and local permitted water quality point source discharge structures. These are monitored according to the requirements or the permit. After revegetation of the reclaimed areas and demonstration of meeting water quality standards, the ditch and berm system is removed. Flows are established as sheetflows, drainage systems, tributaries, or other features according to the reclamation plan approved by the regulatory agencies. At this point, water soil erosion is controlled by the reclaimed system.

Loss of soil from the potential for dust to be generated occurs in windy conditions before mining when land is cleared. High sustained winds, absent rains which hold down or eliminate dust, are typically only associated with the advance and passing of cold fronts during the fall and winter months. High winds in the summer are almost always associated with a thunderstorm event, resulting in little to no dust and only short periods of high winds. Thus, the frequency of these conditions for nuisance dust potential is limited.

Most dust is generated by traffic on unpaved roads or by earthmoving equipment moving dry silty soils. There is almost no dust associated with the hydraulic deposition of sands or clays. Contractors can be required to wet unpaved roads for dust control during these conditions to preclude off-site impacts from dust.

Current mining and reclamation practices result in less radioactivity being left at the surface of reclaimed sites than was the case under past practices. "Toe-spoiling" (the casting of the last soil material removed from a mine cut to the bottom of the adjacent spoil pile) of potentially higher radioactivity "leach zone" material has reduced the potential for near surface radioactivity of graded fill at reclamation sites. All mined lands are now radiologically characterized by Florida BRC (under Chapter 1OD-91 F.A.C.) prior to mining and after reclamation (IMC, 2002). A detailed discussion of the radiological changes after reclamation is presented in Section 4.8.1.5.

4.8.1.2 Matrix Processing

4.8.1.2.1 Conventional Beneficiation (IMC's Proposed Action)

The beneficiation process proposed by IMC would produce quartz sand tailings and clays. The disposal of these two waste products is discussed in detail in Section 4.8.1.4.

4.8.1.3 Plant Siting

4.8.1.3.1 IMC's Proposed Plant Location

Initially, the ore would be pumped to the Fort Green Mine Beneficiation Plant for recovery of the phosphate rock product. When economics warrant, IMC proposes to build a new beneficiation complex at Ona. This complex would impact approximately 150 acres of soil. The impacts would include land clearing and grading to meet the needs of the proposed layout shown in Figure 2.2-3. Some removal of soil may be needed to accommodate plant foundations. Impact would be temporary during the life of the plant and would be restored to approximately pre-mine conditions after mining in the area is completed.

4.8.1.3.2 Other Plant Locations

The two other plant site locations would have similar impacts to soils as described for the proposed action, since the size of the plant site and foundation needs would be similar for any of the locations chosen.

4.8.1.4 Sand and Clay Residuals Management

4.8.1.4.1 Conventional Settling (IMC's Proposed Action)

IMC is proposing to use the conventional waste disposal, which has been traditionally utilized by the central Florida phosphate industry. This method uses the separate sand and clay waste streams from the beneficiation plant for disposal. Based on the annual production rates presented in Table 2.2-1, the mine is expected to produce 170 million dry tons of clay waste and 370 million dry tons of sand during the life of the mine. There generally has not been a problem with the disposal of sand tailings by the phosphate industry. The sand tailings are typically used to backfill mine cuts to a specific elevation. The proposed post-reclamation topography, drainage, and revegetation plans are used to prepare the sand backfill plan. The tailings soil properties are discussed below.

A more complex problem for the Florida phosphate industry, however, has been the disposal of waste clays. These clays, since they contain a large amount of process water, require large areas and extended time-periods to settle and consolidate. The beneficiation plant discharges clay slurry with a content of three to five percent solids, into a clay settling area. After a number of years of stage filling, IMC is estimating a consolidation to about 29 percent solids upon completion, which would result in an increased volume of 71 percent from retained moisture. Because of this water retention, above ground clay settling area impoundments are required.

The area for the clay settling areas is estimated to be 6,269 acres, which includes 4,602 acres for clay storage and 1,667 acres for the footprint of the dikes. The minimum dike height above natural grade is estimated to be 45 to 55 feet. IMC is proposing nine impoundment areas, which range in size from 373 acres to 695 acres and range in volume from 26,100 acre-ft to 59,100 acre-ft. IMC is proposing stage-filling these clay settling areas in which clay wastes are allowed time to settle before new clay is added. This technique would result in the compaction of the original waste clay within a settling area and provides additional capacity for new clay. The total capacity of all the impoundments would accommodate the 351,300 acre-ft of waste clay, which is expected over the project life. The clay's soil properties are discussed below.

Sand tailings would normally be used to create both upland and wetland natural systems, row crops, pasture and citrus. A portion of the sand would also be used to create dams for the clay settling areas. However, during the first half of the mine, there would not be sufficient mine cuts to dispose of the residual sand produced. Therefore, during this period residual sand would be stockpiled in six storage piles on the site. The locations of these storage piles are shown in Figure 2.2-10. During the first half of mining, some of this sand may be sold depending on the quantities accumulated versus the future onsite needs. During the second half of mining, it is anticipated that most of the sand could be used to complete the proposed reclamation.

4.8.1.5 Reclamation

4.8.1.5.1 Conventional (IMC's Proposed Action)

The existing soil types at the Ona site do not create limitations on IMC's ability to reclaim the site into a diverse array of landscapes including upland and wetland natural systems. These soil types can and would be regraded to gentle slopes and revegetated to stable vegetative conditions without unusual difficulties.

The general topography and slopes that would be created are shown on Figure 4.8-1. The slopes used in the reclamation would conform to the current FDEP standard that no slope be steeper than 4H:1V. The only areas that would have slopes that approach this steepness are those around the reclaimed clay settling area dams. Table 4.8-1 presents a comparison of the number of acres in each ten-foot contour range before and after mining. The largest change occurs in the category of areas “more than 40 feet above the base elevation” with an increase of approximately 3,000 acres as a result of the clay settling areas. Most of change in the acreage is from the category of areas “20 to 30 foot above the base elevation” with approximately 1,600 less acres after mining. However, even though the elevation of a portion the site would be higher after mining, in general, the site would be returned to the same relatively flat topography as currently exists.

All of the land proposed for mining would be backfilled with sand and clay, or would be reclaimed by shaping the existing overburden spoils as part of the reclamation process. All of the sand and clay backfill would originate from IMC mine property and all overburden spoil generated by mining the Ona site would be beneficially used on-site as part of the reclamation process.

Reclamation soils occur in three main categories: 1) hydraulically placed clean sand fill; 2) consolidated phosphatic clay that has formed a solid crust capable of supporting normal farm equipment; and, 3) reshaped overburden soils. Variations in the soil characteristics can be achieved by layering combinations of the soils, i.e. overburden caps placed over sand or sand caps placed over clay. The final reclamation landform would be the deciding factor along with the material available at the time, and the best technology for the desired

DRAFT

landform. Figure 4.8-2 illustrates the proposed distribution of post-reclamation soils. With the exception of the consolidated clay soils in the former clay settling areas, the qualities of the reclaimed soils would not present any limitations that would preclude the construction of buildings, roads, and parking lots. The only unique procedure that has been required in certain locations is supplemental compaction to ensure that the soil density or compaction approximates the specified conditions.

The composition of the clay backfill is similar to phosphatic clays contained in the Bone Valley Phosphate Formation. Major mineralogical components include montmorillonite, attapulgite, and quartz sand, with minor amounts of feldspar. The composition of the sand is predominantly quartz (silica), with very minute amounts of phosphate particles not recovered by the flotation process. The sand particles are sized between the 16 and 150 US standard sieve screen sizes.

Sand backfill is relatively sterile with regard to organic material and nutrients. Only plants that are adapted to xeric conditions typically found in well drained soils can survive in this medium without irrigation. Therefore, except for xeric reclamation areas, overburden capping would be used in sand backfill areas to add a certain amount of clay and organic material back to the plant root zone. Overburden soils are capable of supporting many types of vegetation including native grasses and shrubs, pasture grasses and upland trees. The bearing strength of these soils is high and no limitations exist in terms of building construction. Shaped overburden soils contain no limitations with the possible exception of supporting vegetation with specific soil profile requirements. Where feasible, topsoil from areas to be mined would be relocated onto reclamation projects to introduce specific soil profiles, seed materials or beneficial bacteria or nutrients into the soil structure. Sand and overburden soils are frequently used in the reclamation of wetland mitigation areas and other types of natural Florida habitat reclamation.

Consolidated clay soils have demonstrated a high capacity for supporting many types of vegetation including citrus, forage, and truck farm production. FIPR research has found that the clay soils have improved moisture and nutrient holding capacity when compared to native soils. The results of the research shown in Table 4.8-2 indicate the reclaimed clay settling areas outperformed native Hardee County soils for the crops studied. The principal reason is the chemical properties of the clay and native soils. Table 4.8-3 presents a comparison of the data contained in the Hardee County Soil survey and the FIPR Report. The reclaimed clay settling areas currently are utilized for pasture and other productive uses. They would support wetland systems and other natural green-space type requirements. Because of the nature of heavy clay soils, they are not suitable for building construction without special design. The surrounding containment berms are capable of supporting construction following reclamation and this use has been planned in a large residential development in Polk County.

Wind soil erosion during the site preparation, construction, mining, and reclamation is reduced by the presence of the grassed ditch berms and vegetation, both natural and planted around the perimeter of the area. The potential for dust to be generated in windy conditions occurs after final contouring of the land is occurring. During reclamation, newly recontoured soils in sensitive areas may be dampened to help in controlling wind erosion until the area is revegetated. Revegetation of recontoured areas usually occurs after one growing season.

In Section 3.8, Table 3.8-3 summarizes the typical concentrations of Radium-226 in phosphate ore and in various products and by-products of the beneficiation process (USEPA, 1975). These concentrations indicate that most of the Radium-226 tends to remain with the rock and the clay wastes. The radium also tends to remain bound to the particles in these materials and does not dissolve readily. The expected concentrations of radiation on the clay settling areas after reclamation would be higher than the existing conditions and other reclaimed areas of the site. However, the results of an extensive agricultural study on reclaimed land by FIPR resulted in the following observations:

> *"The natural range in radionuclide content among various kinds of foods is greater than the difference in radionuclides content between the same food produced on phosphatic clays and natural soils.*
>
> *The risk level associated with radionuclides in foods (about 1 in 1,000,000/yr) are considered to be insignificant or de minimis"* (FIPR, 1996).

4.8.2 IMC's Original Area to be Mined Alternative

4.8.2.1 Mining Methods, Matrix Processing, and Plant Siting

Impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. However, since 1,757 more acres would be disturbed, the impacts would be somewhat greater.

Under this alternative, there would be floodplain buffers around Horse Creek, West Fork Horse Creek, and Brushy Creek that are similar to both other action alternatives. However, there would be no buffer around Oak Creek or Hickory Creek. Therefore, impacts, such as sedimentation, associated with soil disturbance, as well as changes in the site topography would have an adverse impact on Oak and Hickory Creeks.

4.8.2.2 Sand and Clay Residuals Management

Impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. However, because of the larger number of acres that would be disturbed, the number of tons of residual sand and clay would be greater. Assuming

DRAFT

similar dam heights and settling area depths as the Proposed Action Alternative, approximately 1,500 acres would be needed to dispose of the clay generated from the matrix mined to produce the additional 34 million tons of phosphate.

4.8.2.3 Reclamation

Impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. Natural Systems Group Recommended Areas of Conservation Interest

4.8.2.4 Mining Methods, Matrix Processing, and Plant Siting

Impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. However, since 2,867 fewer acres would be disturbed, the impacts would be somewhat less.

Under this alternative, there would be floodplain buffers around Horse Creek, West Fork Horse Creek, and Brushy Creek that are similar to the Proposed Action Alternative. However, there would be an additional buffer only around the lower portion of Oak Creek south of SR 64, and reduced buffers on Oak Creek north of SR 64. In the Hickory Creek basin there would be a no-mine area in the lower portion of the basin. Therefore, potential impacts, such as sedimentation, associated with soil disturbance, would be similar for Oak Creek and slightly reduced for Hickory Creek.

4.8.2.5 Sand and Clay Residuals Management

Impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. However, because of the fewer number of acres that would be disturbed, the number of tons of residual sand and clay would be less. Assuming similar dam heights and settling area depths as the Proposed Action Alternative, approximately 800 acres less would be needed to dispose of the clay generated from the matrix mined based on a reduction of 18 million tons of phosphate production.

4.8.2.6 Reclamation

Impacts associated with this alternative would be similar to those described for the Proposed Action Alternative.

4.8.3 No USACE Jurisdictional Wetlands Impacts Alternative

To avoid any impacts to USACE wetlands, only approximately 1,122 acres of uplands on the western side of Horse Creek (five percent of the total acreage) could be considered for mining.

The No Wetlands Impact alternative would result a maximum of 1,122 acres of soils that could be impacted by mining. Reclamation would consist of similar landforms as are presented on Figure 2.2-11. Other impacts for matrix processing and plant site would no longer apply to this alternative. The impacts from sand and clay residuals management and reclamation would be limited to the area of mining, which would only be approximately seven percent of the IMC proposed action acreage. The description of the reclaimed soils would be similar to those described in Section 4.8.1.5. Impacts to the remainder of the site left undisturbed would be similar to those described for the No Action Alternative in Section 4.8.3.

4.8.4 No Action Alternative

The site soils would remain relatively unchanged in the near future if no action is taken. The long-term changes may include land development for agricultural purposes and an increase in impervious areas and foundation excavation for urbanization. These changes to soil types would be permanent in those areas of the site where urbanization occurs.

4.9 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

The hazardous materials that would be utilized at the proposed Ona site include sulfuric acid used in the mineral beneficiation process, motor fuels (e.g., unleaded regular gasoline and road and off-road diesel fuel), and equipment and building maintenance chemicals (e.g., paints, thinners, and non-aqueous solvents). These hazardous materials would be utilized in the beneficiation plant, the mobile equipment, and repair shops; no hazardous materials would be generated by the production of phosphate rock. Small quantities of laboratory reagents, some of which are hazardous, would be utilized in the product quality laboratory. All hazardous waste generated by the proposed Ona site would be managed in accordance with Chapter 62-730 (F.A.C., 2000).

4.9.1 Proposed Action Alternatives

4.9.1.1 Mining Methods

4.9.1.1.1 Dragline Mining (IMC's Proposed Action)

Generation of hazardous waste would be limited to spent fluids used to maintain mobile equipment and the plant infrastructure. These wastes principally include spent parts cleaners (e.g., mineral spirits), which are characteristically hazardous due to ignitability. Small quantities of waste maintenance paint and other maintenance chemicals may also be generated. The only chemicals used on the draglines are common oils and greases and mineral spirits (for cleaning). All of these are contained, and disposed of in the proper manner. IMC has implemented hazardous materials management plans at all of its existing mines and would likewise implement these plans at the proposed Ona site. These plans include obtaining a generator identification number, maintaining designated hazardous waste accumulation areas, segregation of incompatible waste types, use of proper containers and secondary containment areas, employee training, prompt scheduling of off-site shipments, and waste minimization.

DRAFT

4.9.1.2 Matrix Processing

4.9.1.2.1 Conventional Beneficiation (IMC's Proposed Action)

Hazardous waste would be separated from the solid waste stream through the use of non-hazardous materials where available, use of dedicated closed-type parts washer systems, and training of maintenance employees. As noted above, IMC's existing corporate-wide hazardous waste management plan would be implemented and the proposed Ona Beneficiation plant would include properly-designed above grade mineral acid and fuel storage tanks and designated hazardous waste accumulation areas, all with secondary containment. Emergencies would be managed in accordance with IMC's corporate safety program.

The principal hazardous waste expected to be generated, spent parts washing solutions, would be recycled by the service provider (e.g., Safety-Kleen®). Off-site disposal of miscellaneous maintenance wastes would be provided by one of many FDEP-licensed hazardous waste transporters who would forward the small quantities expected to USEPA-approved hazardous waste treatment or disposal facilities. All reagents would be stored in aboveground steel tanks equipped with secondary containment. None of these substances are subject to the USEPA's Risk Management Program.

Reagents IMC Expects to Store at the Ona Beneficiation Plant

Reagent	Approximate Storage Capacity	Form
Fuel Oil	50,000 gallons	Liquid
Fatty Acid	100,000 gallons	Liquid
Sodium Silicate	15,000 gallons	Liquid
Soda Ash	65,000 gallons	Liquid*
Sulfuric Acid	40,000 gallons	Liquid
Amines	12,000 gallons	Liquid
Diesel Fuel	10,000 gallons	Liquid
Ferrosilicon	11,000 pounds	Solid
Magnetite	4,000 cubic feet	Solid

* Soda ash may be received as a solid (powder), but would be mixed with water and stored as a liquid.

4.9.1.3 Plant Siting

4.9.1.3.1 IMC's Proposed Plant Location

All underground and aboveground storage tanks of a certain size that contain petroleum products or other regulated materials and wastes would require registration with the FDEP. Tanks would be registered at the appropriate time, which would be during plant construction. At that time, IMC would provide plans for storage of all reagents, fuels and any regulated materials. Currently, all of the tanks at the Fort Green Beneficiation Plant (which would be used for beneficiation during the first part of mining) that are subject to these regulations have been registered.

4.9.1.3.2 Other Plant Sites

The two alternate plant site locations would have the same permitting and management requirements as is described for the proposed action in Section 4.9.1.3.1.

4.9.1.4 Sand and Clay Residuals Management

4.9.1.4.1 Conventional Settling (IMC's Proposed Action)

IMC is proposing to use the conventional waste disposal, which has been traditionally utilized by the central Florida phosphate industry. This method uses the separate sand and clay waste streams from the beneficiation plant for disposal. This waste disposal method would produce no hazardous waste.

4.9.1.5 Reclamation

4.9.1.5.1 Conventional (IMC's Proposed Action)

All of the land proposed for mining would be backfilled with sand, clay or would be reclaimed by shaping the existing overburden spoils with earth moving equipment as part of the reclamation process. Generation of hazardous waste would be limited to spent fluids used to maintain mobile equipment. Handling and disposal of the small quantities generated from these activities are described in earlier in this section.

4.9.2 IMC's Original Area to be Mined Alternative

The use of hazardous materials would be similar for this alternative as for the Proposed Action Alternative. Therefore, impacts associated with this alternative would be similar to those described for the Proposed Action Alternative.

4.9.3 Natural Systems Group Recommended Areas of Conservation Interest

The use of hazardous materials would be similar for this alternative as for the Proposed Action Alternative. Therefore, impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. No USACE Jurisdictional Wetlands Impacts Alternative

To avoid any impacts to USACE wetlands, only approximately 1,122 acres of uplands on the western side of Horse Creek (5 percent of the total acreage) could be considered for mining.

The No USACE Jurisdictional Wetlands Impacts Alternative would result a maximum of 1,122 acres of mining area that would have the potential to utilize equipment, which would generate hazardous waste. The types of impacts would be similar to those created by mining, sand and clay residuals management, and reclamation described for the proposed action. The quantity of hazardous waste generated would be expected to be approximately seven percent in proportion to the reduced area being mined. Impacts to the remainder of the site left undisturbed would be similar to those described for the No Action Alternative in Section 4.9.3.

4.9.4 No Action Alternative

The site would remain relatively unchanged in the near future if no action is taken and hazardous waste generation would be limited to the present level for mobile equipment used as part of existing improved pasture and agricultural activities. The long-term changes may include land development for agricultural purposes and an increase hazardous waste generation as part of increased urbanization.

4.10 AIR QUALITY

The FDEP routinely measures ambient air quality in the vicinity of phosphate mines located in Polk County. Specifically, FDEP has operated a network of stations that monitor PM and particulate matter with an aerodynamic diameter equal to or less than PM_{10} monitors for many years. A summary of the data collected by FDEP over the last ten years (1991 to 2000) is presented in Table 4.10-1. As shown in Table 4.10-1, FDEP has not reported any exceedances or violations of the annual or 24-hour average PM_{10} ambient air quality standard (AAQS) of 50 and 150 micrograms per cubic meter ($\mu g/m^3$), respectively. In fact, Polk County is classified by FDEP as being in attainment with the AAQS for all criteria pollutants typically released by sources associated with the phosphate industry. Although FDEP does not collect ambient data in Hardee County, there is nothing unique about the existing and proposed operation of the phosphate industry in Hardee County that would render the air quality any different than that measured in Polk County. Based upon historical ambient air quality data collected during the past 25 years in Polk and Hillsborough Counties adjacent to active mining operations, there is no evidence to support the conclusion that mining of the Ona tract would cause air quality in Hardee County to fail to attain any of the NAAQS in the future.

A discussion of IMC's proposed Ona Mine operation and associated sources of emissions is presented below. The same BMPs currently used by IMC and other phosphate companies in Polk County are proposed by IMC for its operations in Hardee County. If necessary, IMC would obtain the proper construction permits and update its Title V Air Operation Permit to reflect the new operations associated with the Ona expansion.

DRAFT

4.10.1 Proposed Action Alternative

4.10.1.1 Mining Methods

4.10.1.1.1 <u>Dragline Mining (IMC's Proposed Action)</u>

The dragline mining operation proposed by IMC involves the clearing of vegetation, the removal of overburden, the extraction of the phosphate matrix, and various support and maintenance operations. Each of these activities has the potential to generate air emissions that can impact ambient air quality. These releases include fugitive PM emissions from the movement of heavy equipment and earth moving activities, as well as PM, CO, SO_2, nitrogen oxides (NO_x), and volatile organic compound (VOC) emissions from the combustion of gasoline and diesel fuel. Additionally, fugitive PM emissions may result from wind erosion of exposed soils.

Dragline mining requires that land be cleared in advance of the actual mining operation. Areas with significant numbers of trees must be cleared well in advance of the mining operation to allow for the removal of woody material (i.e., stumps, limbs, etc.) that could interfere with the mining process. In such areas, additional land is typically cleared in anticipation of the onset of the rainy season to avoid problems with moving heavy equipment on saturated soil. Wind erosion of exposed soil and movement of heavy equipment on cleared land can result in the generation of fugitive PM emissions.

IMC proposes to burn the vegetation on land to be mined in accordance with the state open burning regulations (i.e. Chapter 62-256, F.A.C.). The stated intent of the FDEP in promulgating Rule 62-256 was to allow open burning only when it is conducted in a manner, under conditions, and within certain periods that would reduce or eliminate the deleterious and nuisance effect of air pollution (F.A.C., 1994).

The impact of land clearing activities on air quality, either through mechanical means or by burning, would be minimal since the amount of land burned or exposed at any given time would be limited to the amount that can be mined in the near future, and IMC would adhere to the requirement of the opening burning regulations. These measures would reduce the magnitude and duration of emissions.

Once the land is cleared, IMC would use draglines to remove the overburden, extract the phosphate matrix, and reclaim the land. The draglines proposed by IMC for use at the Ona site would be electrically powered. As such, they would not be sources of air pollutants associated with the combustion of fossil fuels. However, the draglines would be sources of fugitive PM emissions generated by earth moving activities. Because the overburden and mined materials are generally wet, fugitive PM emissions would only occur in isolated instances when surface areas become dry. Since these emissions would be confined to the vicinity of the dragline off-site impacts to air quality are expected to be negligible.

Another source of air emissions associated with the proposed mining operation is vehicular traffic associated with transportation of operation and maintenance personnel on the roadways within the mine area. Emissions from these vehicles include CO, NO_x, SO_2, PM, and VOC associated with combustion of gasoline and diesel fuel, as well as fugitive PM emissions generated by traffic on unpaved roads. Fugitive PM on the roads would be controlled by watering and limiting vehicle speed, as needed. These emissions would have minimal off-site impact since they are intermittent and would be confined to the mine site.

4.10.1.2 Matrix Transport

4.10.1.2.1 Slurry Matrix Transport (IMC's Proposed Action)

IMC is proposing to mix the phosphate matrix extracted by the dragline with water in a shallow, ground level depression at the point of mining creating slurry. This slurry would be transported by pipeline, initially to IMC's existing Fort Green beneficiation plant and later to a new beneficiation plant to be located at the Ona site. Since the matrix would be handled in slurry form and electric motors would be used to power the pumps, there would be no emissions associated with the proposed matrix transport system.

4.10.1.2.2 Conveyor Transport

There are several sources of fugitive dust emissions associated with conveying systems: entrainment of dust exposed surfaces caused either by the wind or the velocity of the belt, the transfer of material to, from, and between conveyors (material transfer points), and to a lesser extent, spills and material carryover (dust that statically or physically adheres to the return side of the belt). The largest source of PM emissions during conveyor transport is from material transfer operations.

Given the generally high moisture content of the conveyed phosphate matrix, fugitive dust emissions are not expected to be significant from tube conveyors, or V- or U-shaped belts, but greater than those for slurry transport operations.

4.10.1.3 Matrix Processing

4.10.1.3.1 Conventional Beneficiation (IMC's Proposed Action)

Initially, there would be no air emissions at the Ona site from the beneficiation process as IMC is planning to transport the matrix slurry via a pipeline to their existing beneficiation plant located at their Fort Green facility. Eventually, IMC plans to construct a beneficiation plant at the Ona site. None of the component operations associated with conventional beneficiation are considered to be significant air pollution sources. There would be no concentrates/fertilizer, rock drying, or other stationary combustion sources at the Ona Beneficiation Plant. Although there might be some wind erosion losses from product dumping into rail cars, onto pebble storage piles, or fugitive PM emissions resulting from road traffic, these sources would be intermittent and located away from the property boundaries. Therefore, they should not contribute significantly to off-site impacts on air quality.

IMC would construct a soda ash delivery, storage, and transfer system at the future Ona Beneficiation Plant. Particulate matter emissions from the unloading and storage system would be controlled using a baghouse, wet scrubber, or equivalent control equipment, and constructed and operated in accordance with FDEP rules and air permits. Again, since this source would be centrally located within the Ona site and emissions would be minor and intermittent, this source should not result in measurable impacts to ambient air quality.

Transfer and storage of some of the flotation reagents could result in emissions of VOCs. Reagents can include #2 fuel oil, fatty acids, amines, soda ash, diesel fuel, sulfuric acid, and tall oil. For example, when a diesel fuel tank is filled, the vapor headspace, containing gaseous VOCs, would be vented to the atmosphere. Similar emissions could result from the handling and storage of fatty acids, amines, and fuel oil. However, since the vapor pressures of these materials are low (i.e., do not readily evaporate), emissions would be quite small.

4.10.1.4 Plant Siting

4.10.1.4.1 <u>IMC's Proposed Plant Location</u>

There is nothing unique about IMC's proposed location of the beneficiation plant in regards to the generation of PM emissions. The potential sources of PM and VOC emissions would exist regardless of the location of the facility. However, since IMC is proposing to centrally locate the plant within the Ona site, any emissions would disperse and not adversely affect off-site ambient air quality.

4.10.1.4.2 <u>Other Plant Locations</u>

Since most of the PM emissions from the proposed beneficiation operation are near ground-level fugitive releases, these emissions are not expected to carry very far from the facility location. Therefore, as long as the beneficiation operation is centrally located within the property, potential air quality impacts from the facility would remain similar. The closer the facility is located to the edge of the property boundary, the greater the potential for off-site impacts would likely be.

4.10.1.5 Water Management

None of IMC's proposed or optional water management practices are expected to have a significant affect on ambient air quality in the vicinity of the Ona site.

4.10.1.6 Waste Management

Neither IMC's proposed or optional waste management practices are expected to differ significantly with regards to impacts on ambient air quality. Chemical flocculants may be used to speed the consolidation of clay for the proposed waste management method (Conventional Disposal Method) or for either of the optional methods (sand/clay mixing or conventional disposal with sand/clay capping). If chemical flocculants were used, there would be minor impacts to the ambient air from fugitive PM emissions resulting from transfer, mixing, and storage of chemical flocculants.

4.10.1.7 Reclamation

4.10.1.7.1 Conventional (IMC's Proposed Action)

During reclamation, earthmoving equipment and vehicular traffic would generate fugitive PM and combustion emissions (PM, CO, SO_2, NO_x, and VOCs) as the land are recontoured. Emissions associated with fugitive dust would rapidly disperse over the open mine site resulting in minimal impacts to ambient air. Once the land is recontoured, IMC would employ the use of quick germinating temporary cover crops to control fugitive PM emissions until natural seeding and permanent revegetation takes place.

4.10.1.8 Product Transport

4.10.1.8.1 Rail (IMC's Proposed Action)

The fugitive PM emissions expected during railcar loading were included in the discussion for the beneficiation plant. The only other emissions that would occur from railcar transportation of the product would be the products of combustion (PM, CO, SO_2, NO_x, and VOCs) from the diesel fuel used to power the trains.

4.10.1.8.2 Truck Transport

One option to transporting the product by rail would be to transport it by truck. Fugitive and combustion-related emissions (PM, CO, SO_2, NO_x, and VOCs) from using trucks to transport the product would be similar to those for railcar with one notable exception. The use of trucks to transport the product would result in additional fugitive PM emissions from vehicular traffic on unpaved roads. As such, IMC's proposed use of railcars to transport the product would result in lower emissions compared to truck transport.

4.10.2 IMC's Original Area to be Mined Alternative

This alternative has the potential to generate air emissions that can impact ambient air quality, including fugitive PM emissions from the movement of heavy equipment and earth moving activities, as well as PM, CO, SO_2, nitrogen oxides (NO_x), and volatile organic compound (VOC) emissions from the combustion of gasoline and diesel fuel. Additionally, fugitive PM emissions may result from wind erosion of exposed soils. These impacts would be similar to those described for the Proposed Action Alternative. However, because of the greater number of acres being disturbed, there is the potential for air quality impacts to be slightly greater.

4.10.3 Natural Systems Group Recommended Areas of Conservation Interest

As with the other two action alternatives, this alternative has the potential to generate air emissions that can impact ambient air quality, including fugitive PM emissions from the movement of heavy equipment and earth moving activities, as well as PM, CO, SO_2, nitrogen oxides (NO_x), and volatile organic compound (VOC) emissions from the combustion of gasoline and diesel fuel. Additionally, fugitive PM emissions may result from wind erosion of exposed soils. These impacts would be similar to those described for the Proposed Action Alternative. However, because of the lesser number of acres being disturbed, there is the potential for air quality impacts to be slightly less. No USACE Jurisdictional Wetlands Impacts Alternative

To avoid any impacts to USACE wetlands, approximately 1,122 acres of uplands on the western side of Horse Creek (5 percent of the total acreage) could be considered for mining.

The No USACE Jurisdictional Wetlands Impacts Alternative would result a maximum of 1,122 acres of mining area that would have the potential to utilize equipment, which would generate localized air quality impacts. The types of impacts would be similar to those created by mining, sand and clay residuals management, and reclamation described for the proposed action. Impacts to the remainder of the site left undisturbed would be similar to those described for the No Action Alternative in Section 4.10.3.

4.10.4 No Action Alternative

The impacts to the ambient air quality due to the termination of the project would be expected to be consistent with the current, mostly agriculture, use of the land.

4.11 NOISE

4.11.1 Proposed Action Alternative

Central to all noise analyses and projections are the well-documented scientific principles that noise levels diminish with distance, and that disorganized sound pressure levels, such as equipment noise, do not travel as far as organized sound pressure levels, such as music; this is why humans hear the approaching car or tractor radio well before they hear the car or tractor. Absent any sound absorption materials, such as forested areas, sound dissipates in open space, such as a mall parking lot, at the rate of:

$$L_2 = L_1 - 20 \log (D_2/D_1), \text{ where}$$

L_2 is the noise level at distance 2 (D_2)

L_1 is the noise level at distance 1 (D_1)

DRAFT

Using this equation and numerous measurements of noise related to phosphate mining and beneficiation plant operation, it is possible to project the noise levels that would be generated by the proposed Ona Mine.

The Ona site is currently vegetated with a mixture of improved pasture surrounded by native vegetation in the form of rangeland, upland forests, and herbaceous and forested wetlands. Approximately forty percent of the land has been improved to support agricultural operations and twenty percent is covered with wetland vegetation, leaving about 40 percent of the land as native uplands. However, development is presently underway in the vicinity of the Ona site, including several thermal power plants and a wastewater treatment plant. Therefore, an increase in noise levels in the vicinity of the Ona site can be anticipated.

4.11.1.1 Mining Methods

4.11.1.1.1 Dragline Mining (IMC's Proposed Action)

Extensive noise surveys of active mining areas, including draglines and all related equipment have been conducted by the USEPA, the Hillsborough County Environmental Protection Commission (HCEPC), FIPR, and other privately and publicly funded research organizations. All of these measurements recorded noise levels of between 50 to 75 dBA within a distance of 200 feet (IMC, 2002). For example, in February, May, August, and December of 1994, Ping, et al (1996), measured noise levels generated by four different types of draglines. These draglines included models 1150B, 1260W, 1250B, and 752. The draglines were in operation at the Noralyn, Clear Springs, Phosphoria, and Fort Green Mines, respectively. The results of the testing showed that the Clear Springs dragline produced the highest noise energy and Fort Green produced the lowest. The regression line generated for the Clear Springs dragline using all equivalent continuous sound level measurements taken during field monitoring ranged from a high of approximately 93 dBA at a distance of 50 feet, to a low of 55 dBA at 1117 feet. The highest measurements taken were 94 dBA and 63 dBA at approximately 43 feet and 800 feet, respectively (Ping, et al, 1996).

In an extensive analysis, HCEPC concluded that a setback distance of 600 feet would ensure, with a margin of safety, that Hillsborough County's nighttime noise standard of 55 dBA would be met at all times, given that the majority of their measurements taken 400 feet away ranged between 53 and 56 dBA, with a maximum of 58 dBA (IMC, 2002). Additionally, measurements taken by Ping, et al (1996) of the four dragline showed that 55 dBA was maintained at 1,117 feet at Clear Springs, 611 feet at Noralyn, 505 feet at Phosphoria, and 463 feet at Fort Green. The average for all four draglines for the four testing periods in 1994 is 667 feet.

Decibel levels between 55 and 65 dBA are considered discretionary. The distance needed to maintain 65 dBA is 445 feet at Clear Springs, 212 feet at Noralyn, 160 feet at Phosphoria, and 136 feet at Fort Green. The average for all four draglines for the four testing periods in 1994 is 238 feet. Based on the measurements taken, all of the draglines except Clear Springs generated 56 dBA or less at a distance of 500 feet. The Clear Springs dragline generated 64 dBA. At a distance of 500 feet, the average noise level for all four draglines for the four testing periods was approximately 57 dBA.

These analyses demonstrate that the 500-foot setback imposed by the Hardee County LDC should allow noise levels in adjacent properties to be approximately 55 dBA, which is considered an acceptable level of impact.

IMC has requested a variance of the Hardee County 500-foot setback to allow the draglines to operate at a distance of less than 500 feet, and to produce decibels in excess of 75 dBA. The noise generated by draglines is from the ventilating fans, which can be reconfigured or muffled to reduce the noise levels. In addition, IMC would modify the work schedule for those locations where noise is an issue for residences, and would not work the nighttime shift (Smith, 2002).

Noise impacts would be minor where the 500-foot setback is maintained. With the implementation of mitigation measures described above, noise impacts would be moderate where the setback is less than 500 feet. All noise impacts would be temporary for any location since the draglines are mobile and move around the site in accordance with the mine plan.

4.11.1.2 Matrix Transport

4.11.1.2.1 Slurry Matrix Transport (IMC's Proposed Action)

Using pipeline slurry to transport the mined matrix is a low noise operation and would not adversely impact the areas along the route of travel.

4.11.1.2.2 Conveyor Transport

Using conveyors to transport the matrix is also a low noise operation, except near matrix transfer points where noise levels can be higher, but in the same range as a matrix pump.

4.11.1.3 Matrix Processing

4.11.1.3.1 Conventional Beneficiation (IMC's Proposed Action)

Noise generated by the proposed Ona Beneficiation Plant is not expected to be noticeable to public receptors because the nearest possible receptor site is over 4,000 feet away. As discussed in Section 4.11.1.1 noise impacts from dragline operations would be within noise standards at a distance of 500 to 600 feet. Therefore, at a distance of 4,000 feet

DRAFT

noise energy generated by the beneficiation plant would have dissipated to less than noticeable levels.

4.11.1.4 Plant Siting

4.11.1.4.1 IMC's Proposed Plant Location

The noise levels attributable to normal plant operations would be about 58 dBA at the entrance road intersection with SR 64, about 35 dBA at the western edge of the Ona Rural Center community, and about 42 dBA at the closest possible off-site location (i.e., about 4,000 feet away); all of these projections assume that all land between the beneficiation plant and the receptor site have been cleared of all vegetation. Due to the dense forested vegetation that would be maintained between the plant site and the receptor sites due to the location of the "areas of conservation interest," actual noise levels would not likely be discernable from other existing sources of noise.

4.11.1.4.2 Other Plant Locations

Alternate plant site #1 is approximately 3,500 feet from the closest possible off-site location. Therefore, noise characteristics would be similar to the proposed site and minimal impacts are anticipated.

Alternate plant site #2 is approximately 2,000 feet from the community of Ona. Although closer to Ona than the proposed site or alternate site #1, a distance of 2,000 feet is adequate for noise energy generated by the beneficiation plant to have dissipated to less than noticeable levels. This is particularly true given that noise impacts from dragline operations, which are somewhat higher than for beneficiation plants, have been shown to be within the noise standard of 55 dBA at a distance of 500 to 600 feet.

4.11.1.5 Reclamation

4.11.1.5.1 Conventional (IMC's Proposed Action)

Land reclamation activities have been monitored by USEPA and privately-funded researchers. Sound levels measured about 200 feet away ranged from 68 to 78 dBA. At a distance of 500 feet, these noise levels would decay to between 60 and 70 dBA, which falls within levels defined as acceptable during daylight hours. Note that reclamation activities are conducted during daylight hours, and would occur adjacent to a specific receptor site only once for a period of three to six months.

Upon completion of land reclamation activities, noise levels would likely return to the ambient levels that existed prior to mining activities.

DRAFT

4.11.1.6 Product Transport

4.11.1.6.1 Rail (IMC's Proposed Action)

The noise impacts due to rail transport of the final product is expected to be minimal as a total of 170 rail car loads per day are anticipated; distributed over two to three trains.

4.11.1.6.2 Truck Transport

Using alternate forms of product transport (i.e., heavy haul trucks) would significantly increase the noise along the transportation route, considering 660 truckloads per day would be anticipated.

4.11.2 IMC's Original Area to be Mined Alternative

Noise impacts associated with this alternative are similar to those described for the Proposed Action Alternative. However, because the number of acres to be disturbed is greater, the mining period may be longer and therefore, the period of time associated with the described noise impacts may be longer.

4.11.3 Natural Systems Group Recommended Areas of Conservation Interest

Noise impacts associated with this alternative are similar to those described for the Proposed Action Alternative. However, because the number of acres to be disturbed is fewer, the mining period may be shorter and therefore, the period of time associated with the described noise impacts may be shorter.

4.11.4 No USACE Jurisdictional Wetlands Impacts Alternative

To avoid any impacts to USACE wetlands, approximately 1,122 acres of uplands on the western side of Horse Creek (5 percent of the total acreage) could be considered for mining.

The No USACE Jurisdictional Wetlands Impacts Alternative would result a maximum of 1,122 acres of mining area that would have the potential to utilize equipment, which would generate noise. The types of impacts would be similar to those created by mining, sand and clay residuals management, and reclamation described for the proposed action. Impacts to the remainder of the site left undisturbed would be similar to those described for the No Action Alternative in Section 4.11.3.

4.11.5 No Action Alternative

Under this alternative, no mining activities would occur at the Ona site. Therefore, no noise would be generated by mining activities. Development is presently underway in the vicinity of the Ona site, including several thermal power plants and a wastewater treatment plant. Therefore, an increase in noise levels in the vicinity of the Ona site can be anticipated.

4.12 SOCIOECONOMICS

Development of the Ona Mine would provide access to the recovery of phosphate; a naturally-occurring, non-renewable resource that has limited availability. Phosphate is an essential component of commercial fertilizers that are used worldwide to increase crop yields and meet demands for feeding the people around the world.

IMC's proposed Ona Mine would provide supplies of phosphate rock to its' two concentrate/fertilizer plants located in Polk County, and its two plants located in southern Louisiana. It would also allow for supplies to be provided to other domestic and international phosphate rock customers throughout the next 16 to 24 years.

Phosphate deposits are located around the world, but not all deposits are considered mineable. West central Florida currently has the most concentrated and economically recoverable source of phosphate in the US. The existing predominant agricultural land use would allow for economical extraction of the phosphate from the land. However, if the land use should change, perhaps to moderately dense residential or industrial, there is the potential for permanent loss of access to the phosphate.

If this natural resource in southwestern central Florida could not be extracted and utilized, IMC would need to search for alternate sources of phosphate, and the US supply of phosphate could be severely impacted (IMC, 2002). The US produces the most phosphate in the world, while Morocco and China rank second and third, respectively. Currently, Florida is providing approximately 75 percent of the US supply of phosphate fertilizer and approximately 25 percent of the world's supply (FIPR, 2001a).

Nationally, mining of the Ona site would, in part, offset record negative trade imbalances through the export of phosphate fertilizers. Beyond the central Florida and Tampa Bay regions, the phosphate rock extracted from the Ona site, following its conversion into fertilizer, would continue to generate economic benefits to the region in the form of export revenue when either the fertilizer itself, or the citrus, grain, meat, or poultry products produced from it, are exported. Fertilizer and food exports are one of a relatively few trade categories that consistently produce favorable trade balances for the US (IMC, 2002).

Phosphate mining and fertilizer manufacturing activities in Florida are a major part of the region's industrial base. The economic benefits that accompany the industry's presence include the direct employment of almost 8,000 people, and employment of up to 40,000 others in second- and third-tier supporting businesses, most of whom earn wages that exceed the average Florida per capita income (IMC, 2002).

Locally, the property taxes paid to Hardee County during the next 16 to 24 years would be significantly increased over the current property tax yield, thereby offering the citizens of Hardee County either increased services from local government or a lower property tax rate (IMC, 2002). Mining of the Ona tract would generate up to $8 million annually in severance tax proceeds that would be shared between the state and Hardee County (IMC, 2002).

4.12.1 Proposed Action Alternative

Human impacts likely to result from this project include: 1) increased property tax revenue to Polk and Hardee Counties during the life of the mine; 2) a continuation of the existing trip generation levels on SR 37, SR 62, and old SR 37 for the commensurate time-period and eventually increased traffic on SR 64 and CR 663 (the Fort Green-Ona Road); and, 3) an employment center shift from Fort Green to Ona. Socioeconomic impacts are based in part on the number of employees a project generates, and the resulting demand that these employees and their families have on community facilities and services (see Section 3.12.3 for a description of these services).

IMC anticipates that up to 50 new employees would be required for the proposed action alternative. The greatest increase in demand for community facilities and services would result under a scenario where all of these new employees relocate to Hardee County. This would be a primary socioeconomic consideration. This scenario is unlikely since many new employees would commute from existing residences, primarily in Polk and Hardee Counties.

Additionally, under this scenario, the location of these 50 new employees to Hardee County would result in an increase in population of no more than 153 persons. This is based on the assumption that, 1) each employee is married, and 2) the household size is similar to the statewide average household size. Based on the statewide average, these 50 households would also have 53 children, and approximately 41 of these children would be school-aged.

4.12.1.1 Mining Methods

4.12.1.1.1 <u>Dragline Mining (IMC's Proposed Action)</u>

A. <u>Economic Considerations</u>

Conversion of land from agricultural use would result in an economic loss of both land value and production value of the Ona site. As shown in Table 4.2-1, a total of 7,821.8 acres would be converted from agricultural use. The vast majority of these acres (7,006.5) are improved pasture, 144.5 are unimproved pasture, 368.2 are woodland pasture, 93.4 are field crops, and 209.2 are citrus groves. The value of the acreage is approximately $12,242,909 (see Table 4.12-1). Along with the agricultural land value change, there would be the loss of agricultural output for a period of time. However, this conversion is likely to be temporary for some of the acres. As discussed in Section 4.13.1.4.1, post-reclamation land use would include 3,534 acres as agricultural use (e.g., pasture). Due to the rural nature of Hardee County and the small acreage of higher value land (i.e., citrus and field crops), the loss of agricultural land would likely result in replacement elsewhere in the county in subsequent years. The estimated value of the loss of agricultural output is approximately $2,501,389 (see Table 4.12-1).

Continued use of the existing facilities at the Fort Green Mine in Polk County in lieu of their dismantling in 2010 means that the Fort Green Mine property would likely continue to be appraised at least at its current value of $1.5 million. This includes the 140 acres of land occupied by the plant site, the entrance road, and the access corridor connecting these facilities with Hardee County. At the 1999 millage rate of 17.666 mils, Polk County would realize approximately $27,000 annually in property taxes from the continued operation of these facilities. Although construction of similar facilities in Hardee County would be deferred, tax proceeds to Hardee County would increase significantly when mining of the Ona site is approved. The increase would result due to the mining of more acres and the use of additional draglines in the county.

Mining approval of the Ona site would, in part, prevent the deterioration of the region's base of higher paying jobs for mining, beneficiation and concentrates/fertilizer production. The Ona mine and the recovery of phosphate rock would directly generate additional ad valorem tax receipts, severance tax receipts, and fees to Hardee County. With the receipt of these revenues, which would exceed the funding needed to oversee the project, Hardee County can fund other needs to meet the goals of promoting other economic and employment opportunities.

From a US trade perspective, mining of the Ona site would, in part, offset record negative trade imbalances through the export of phosphate fertilizers.

The location of the beneficiation plant at Fort Green in lieu of Ona during the initial years of mining would not likely result in a meaningful change in employment opportunities for residents of Hardee or Polk Counties. Increasingly, over the past twenty years, IMC has employed more Hardee County residents and this gradual trend is expected to continue into the future.

Forestry Resources

The commercial viability of forestry resources in the central Florida region has been, and would continue to be, marginal because the costs to transport harvested timber to saw and paper mills often exceed the value of the timber. Thus, this proposal to mine the Ona site would not materially affect economic forestry activities.

The principal forestry resources currently present on the property are the slash and longleaf pines growing in over 1,400 acres of flatwoods communities. The pine timber would be harvested in advance of clearing the areas for mining. Therefore, the timber value would not be lost. Additionally, mining would not disturb over one-third of these communities. IMC has committed to the reclamation of pine flatwood communities. As a result, there would be no adverse economic impact to forestry resources.

Public Water and Wastewater Facilities

The IMC Ona Mine infrastructure would provide all necessary potable and wastewater treatment capacity, thereby eliminating the need for reliance upon publicly funded services. The long-term modest increase in employment would not result in any significant residential or commercial construction, and therefore would not result in any significant indirect increase in water or wastewater needs due to development.

No public stormwater conveyance structures are located in the area except for road right-of-way drainage systems. No increase in stormwater conveyance to these facilities is proposed, and as a result, no adverse impacts to these facilities are anticipated.

Law Enforcement, Fire Protection, and Emergency Medical Services

Demand for law enforcement, fire protection, and Emergency Medical Services (EMS) at IMC mines has historically been very low and IMC has no reason to forecast an increase in demands upon Hardee County's law enforcement, fire protection and EMS resources. IMC would provide for primary security at the mine and beneficiation plant. Implementation of health and safety plans and ongoing health and safety practices and training would minimize needs for EMS and healthcare services.

There would be no indirect impacts to these services since indirect residential and commercial development is not anticipated to be significant.

Solid Waste

Solid waste for public solid waste management impact assessment purposes excludes the sand and clay residuals used in back-filling mined land as part of the land reclamation process. Also excluded from this discussion are scrap steel, pipe, and other industrial materials, all of which are sold as scrap for recycling. Thus, at the mine and the existing Fort Green and the proposed Ona Beneficiation Plants, the solid waste stream would consist of the domestic solid waste generated by the mine employees, office trash, and trash from the mine maintenance shops (e.g., parts boxes, shrink wrap, etc.)(IMC, 2002). Spent mobile equipment fluids (e.g., waste motor and hydraulic oils, power steering fluids, and anti-freeze), batteries, and tires are collected by vendors such as Safety-Kleen® and recycled, as are all non-aqueous solvents (e.g., mineral spirits-based parts cleaners). The average daily volume of the solid waste to be generated, exclusive of the recycled items, is estimated to be approximately 500 pounds per day (IMC, 2002). The generation of non-process, non-hazardous, solid waste (i.e., plant trash and garbage) is not expected to be excessive nor burdensome to the Hardee County landfill. The five operating draglines would generate about 400 drums per year of waste-grease. This is a non-hazardous material that is burned off-site at an approved facility for energy recovery.

Transportation

Transportation facility capital costs would not be incurred due to the proposed development of the Ona site because publicly funded transportation improvements would not be required. Transportation resources currently present near the Ona site consist of SR 64, CR 663, and Albritton, Post Plant, and Vandolah Roads, as well as the CSX Transportation, Inc. rail line that bifurcates the site. With the exception of the Fort Green-Ona Road (CR 663), which is presently under reconstruction, all of these transportation resources are in good condition and currently provide LOS that exceed state, regional, and local goals. LOS is assigned a letter designation from A through F. LOS A indicates excellent operations with little delay to motorists at non-signalized intersections and very low control delay at signalized intersections. LOS F exists when there are insufficient gaps of acceptable size to allow vehicles on the side street to cross safely, resulting in extremely long total delays and long queues at non-signalized and signalized intersections. LOS E is typically considered to be the limit of acceptable delay, while LOS F is considered to be unacceptable by most drivers (Transportation Research Board, 1997

The total peak hour directional traffic, including the Ona Mine operations traffic on the highway network within the study area is provided on Figure 4.12-1 and Table 4.12-2. As shown in Table 4.12-2, the impacted roadway segments are projected to operate at acceptable LOS in the year 2008 with the proposed Ona Mine operations traffic included. The background traffic in the analysis year 2008 was developed using the annual growth rates shown in Tables 3.12-3 and 3.12-4. Figure 4.12-1 shows both the current traffic pattern to the Fort Green facility and the projected traffic to the Ona Mine site. Due to the small number of employees associated with the mining component of the mine project, and the migratory aspect of draglines, any increase in roadway use would not result in reduced LOS, and changes in traffic patterns would be temporary.

4.12.1.2 Plant Siting

The location of the proposed Ona Beneficiation plant at the Ona site would not cause substantial changes to the socioeconomic environment. The beneficiation plant is proposed as a stand-alone facility and would not use community facilities and infrastructure such as water supply and wastewater treatment and disposal regardless of its location on the property. There would be no change in employment if one of the two other sites is developed and as a result, there would not be an anticipated change in population or housing supply/demand. Furthermore, use of public education facilities is anticipated to be negligible and would not be altered if one of the other plant sites were considered. Commuting patterns of beneficiation plant employees would be altered if the Proposed Action were not undertaken and one of the other alternate sites were developed. Additionally, transportation impacts would be affected since the plant site location would change. Given the moderate level of trips generated by the plant employees and the high level of service that presently exists on area roadways, a reduction of LOS below the minimum levels prescribed by Hardee and Polk Counties is not anticipated. There would be no anticipated changes to ad valorem revenue if the other sites were developed in lieu of the proposed action due to the similarity in valuation methodology anticipated and the consistency in millage rates between the proposed action and the alternate sites.

4.12.1.3 Sand and Clay Residuals Management

4.12.1.3.1 <u>Conventional Settling (IMC's Proposed Action)</u>

Only a small number of people would be affected by the use of clay settling areas. Employment associated with earth moving and surveying would help to sustain existing employment levels, but only for short periods of time throughout the life of the mine. Existing employment levels are modest and no significant increase is expected. Additionally, no adverse impact to ad valorem revenue or community facilities or services is expected.

4.12.1.4 Reclamation

4.12.1.4.1 <u>Conventional (IMC's Proposed Action)</u>

Socioeconomic benefits would accrue to the region as a result of reclamation activities. Employment associated with earth moving, surveying and planting would sustain existing employment levels. Because employment levels are modest and no significant increase is anticipated, no adverse impact to ad valorem revenue, or community services is expected. If significant land and lakes development occurred in a manner that allowed future residential land use, the assessed value of property under this use would increase. This would result in increased ad valorem revenue. Significant demand for development would potentially result in an increase in demand for community services and facilities. If the demand for services increased to the point that new facilities or additional community service staff would be required, the increase in ad valorem revenues would affect the cost for the new facilities and service providers.

4.12.2 IMC's Original Area to be Mined Alternative

Social and economic impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. The number of jobs created with alternative is expected to be the same as for the Proposed Action Alternative.

DRAFT

4.12.3 Natural Systems Group Recommended Areas of Conservation Interest

Social and economic impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. The number of jobs created with alternative is expected to be the same as for the Proposed Action Alternative.

4.12.4 No USACE Jurisdictional Wetlands Impacts Alternative

This alternative would have similar impacts to the No Action Alternative except for the fact that mining 1,122 acres west of Horse Creek would delay the impacts until the mining was completed. Then, the possibility of an out-migration of workers looking for employment could increase the demand on local and state government for support. There could also be an increase in the rate of vacancies in local housing markets, and thereby, reduce the value of houses in the area. The impacts would be amplified by the loss of employment for construction workers since the beneficiation plant would not be built. Lost revenue could lead to lower levels of community services currently provided or anticipated to be provided during the 25 to 30 years that would otherwise be the life expectancy of the mine.

4.12.5 No Action Alternative

Local area demographics, housing, and community services would experience no significant change if the Ona Mine project was terminated due to the low number of mining employees unless there was an out-migration of workers looking for employment elsewhere. Such an out-migration could increase housing vacancies and reduce the housing values. Another impact would be the loss of employment for constructing the beneficiation plant. There could also be a significant reduction in ad valorem revenue and other fees and taxes that accrue to the state and county that would otherwise be generated by the mining project. This could then lead to a lower level of community services currently provided or anticipated to be provided during the mine's life (including transportation infrastructure).

4.13 LAND USE

As mining progresses on other mines in the area, over time the Ona site would be adjacent to active mines located to the north, west, and south. Power plants are being built near Vandolah and the Wauchula Airport. To the east, rural residential areas (i.e., residences and agricultural land on five to twenty acre lots) are likely to increase. Otherwise, no significant changes in non-project related land use are expected to occur.

4.13.1 Proposed Action Alternative

4.13.1.1 Mining Methods

IMC’s proposal to mine and reclaim the Ona site is consistent with the CFRPC's April 1997 SRPP. The SRPP is a long-range guide for the physical, economic, and social development of the region and the protection of regionally significant resources. The SRPP implements and furthers the goals and policies of the State Comprehensive Plan.

The proposed action is consistent with the SRPP "Regional Goal 1.6: Protect or Conserve Natural Resources of Regional Significance (NRRS)" and "Policy 1.6.1: Develop Strategies for the Protection of Natural Resources of Regional Significance." The mining plans properly balance the mutual goals of developing the unique geological resource with the need to avoid impacts to the NRRS, and the reclamation plans provide compensatory mitigation for those limited impacts that would occur.

4.13.1.1.1 Dragline Mining (IMC's Proposed Action)

Dragline mining would have a moderate impact on land use in the vicinity of the community of Ona during the time frame that the dragline is in use in close proximity to developed areas. Light, noise and fugitive dust have the potential to affect certain areas for a brief period of time, particularly in areas to the east and south of the mine.

Similar impacts would occur to the residences located near the western boundary of the mine. No other land use impacts are anticipated due to the very rural nature of the area and lack of development. The proposed mining effects on agriculture are anticipated to be minor since the predominant agricultural use is improved pasture which is prevalent in much of Hardee County and west-central Florida and because post reclamation pasture has proven to be successful.

The moderate impact to land in the vicinity of Ona would be of short duration relative to the life of the mine, and would be minimized by set backs to developed land and roads. Further impact minimization techniques are discussed in Sections 4.10 and 4.11.

IMC plans to mine and reclaim the Ona site are consistent with the Hardee County Comprehensive Plan and the Hardee County Mining Ordinance, which is the principal land development regulation that addresses phosphate mining in Hardee County. Consistency with the provisions and requirement of the Hardee County Mining Ordinance is demonstrated by the analysis presented in this section pertaining to economic benefits and avoiding or minimizing environmental impacts. IMC is requesting the Hardee County Planning and Zoning Board and Board of County Commissioners grant a Major Special Exception Use Permit to allow implementation of IMC's mining and reclamation plans.

The Ona site is entirely located within the Agricultural land use category, as well as, in the Mining Overlay District as an area intended for mining. Portions of the Wauchula Airport are depicted as public/institutional land uses that adjoin the Ona site. Also, the town of Ona, which is classified as a Rural Center land use, adjoins the Ona site. The proposed project is located in the Hardee County Comprehensive Plan Mining Overlay District. Policy L1.10 states, in part,

DRAFT

> *"The mining overlay district is to recognize and protect the vital role of phosphate mining activities in Hardee County. This overlay district includes those areas that are permitted to be mined, are currently being mined, are in the process of reclamation subsequent to mining activity, or are known to be owned by an active mining interest and are intended to be mined at some future date. This overlay district is not meant to be definitive, but to indicate general areas where mining activities are anticipated to occur. Lands may be added to, or released from, this district, without affecting their ability for mining permits, or uses permissible within the underlying future land use classification. Facilities appropriate to support mining activities are permissible. Agricultural uses are permissible. Upon satisfactory reclamation, such lands would be designated appropriately and consistently with the Hardee County Comprehensive Plan".*

The proposed mining of the Ona site is consistent with Policy L.1.10. They both state the extraction and processing of minerals is permitted within the Agricultural land use classification. Agricultural uses, primarily citrus and cattle production, would be occurring on-site prior to mining activities and post-reclamation. No residential or commercial uses are proposed.

IMC would generally comply with the provisions of the Hardee County Unified LDC. IMC is, however, requesting that the Hardee County Planning and Zoning Board and the Board of County Commissioners grant waivers of certain provisions of Section 2.06 of the LDC. Specifically, IMC is requesting:

1. A reduction in the number of air quality monitor stations required;
2. A reduction in the number of rain gauges required;
3. Approval to reclaim a wetland within one-half mile of the Ona Rural Community Center in Section 33, Township 34 South, Range 24 East; and,
4. Approval of noise levels in excess of 75 decibels at those property lines where the approved setback distance would be less than 500 feet or waived by the adjoining landowner.

Similar to current practice, IMC would, in the future, request adjustments to the mining setback provisions established by Section 2.0606 of the LDC. These requests would accompany IMC's Annual Unit Review Submittals as required by Section 2.0605 of the LDC. All requests for alternate setback distances would either be based upon waivers signed by the adjoining landowners or upon other technical justifications.

4.13.1.2 Plant Siting

4.13.1.2.1 IMC's Proposed Plant Location

The location of the proposed beneficiation plant is ideally situated from a land use compatibility perspective. The facility is located in the central portion of the mine and set back from SR 64 by approximately 500 to 600 feet. The plant is remote from both the community of Ona and the few residences that are located in proximity to the western boundary of the proposed mine. Policy L1.6 in the Hardee County 2000 Comprehensive Plan states:

> *"Industrial uses within an Agricultural area may be permitted only when such activity is related to the extraction or processing of minerals; or when related to agriculture; or is of a scale and nature that would not be acceptable in a Town Center. Other industrial uses such as power plants or manufacturing or processing facilities may be permitted, and shall have access to a collector or arterial roadway, shall meet all local regulations, and shall be appropriately buffered from surrounding land uses, including agricultural uses."*

4.13.1.2.2 Other Plant Locations

Two other plant locations are shown on Figure 2.2-1. Alternate Plant Site #1 is the site that was previously proposed by MCC. It is located approximately 1.5 miles to the north, northwest of the community of Ona and is near the existing deep wells. It is a remote location that has been identified for building the clay settling ponds and is also located adjacent to Conservation Area #9. For these reasons, IMC decided to eliminate this location as a plant site (IMC, 2002).

Alternate Plant Site #2 is located approximately 0.5 mile to the north, northwest of the community of Ona (within Conservation Area #11). The potential for impacts on the community of Ona, and the types of vegetation communities on this proposed plant site led IMC to propose that the area not be disturbed. Therefore, this alternate plant site was eliminated (IMC, 2002).

4.13.1.3 Sand and Clay Residuals Management

4.13.1.3.1 Conventional Settling (IMC's Proposed Action)

The vicinity of the clay settling areas is remote in relation to the area's community facilities. There would be no land use compatibility issues due to the remote locations being surrounded by land being mined and by the clay settling areas being removed from residential and community areas. Therefore, there would be no impacts from the proposed clay settling areas.

DRAFT

4.13.1.4 Reclamation

4.13.1.4.1 <u>Post Reclamation Land Use</u>

Chapter 62C-16 of the Florida Administrative Code and Hardee County Ordinance #1999-02 collectively prescribe the minimum standards for phosphate-mined land reclamation in Hardee County. Upon completion of mining disturbance on the land, each acre mined or used to support mining operations would be reclaimed to meet or exceed the regulation requirements.

The proposed land use for the Ona site after reclamation would be primarily agricultural (as is its current land use), supplemented with wetlands and wildlife habitat. Table 4.2-1 shows the various types of vegetation cover proposed. All vegetation communities in the 300, 400, 500, and 600 FLUCFCS-85 series are suitable for use as wildlife habitat.

Once mining is completed, the land would generally be reclaimed as the same use it currently has under the Hardee County Land Development Code, and would continue to be regulated. The potential for use would be quite varied and affected by the reclamation plan. The reclamation plan has positioned various land use features in consideration of two primary objectives, the potential future use and preservation of existing resources. These reclamation features are described in more detail in Sections 2.2.8 and 4.22.

Figure 3.12-6 shows that once reclamation of the 20,676-acre Ona site is complete, approximately 6,978 acres in Part A would be completely reconveyed to the original owners, and up to 10,037 acres in Part B would be partially reconveyed to the original owners (IMC, 2002). Since the prior owners are principally in the cattle ranching business, it is reasonable to project that this acreage would be used primarily for agricultural purposes. The land returned to the owners would be a diverse mix of reclaimed lands including reclaimed clay settling acres, uplands, and wetlands. Approximately 20,654 acres are owned fee simple by IMC. It is also reasonable to assume that much of the property would revert to agricultural use as well. Notable exceptions include the possibility of sporadic commercial, residential, and industrial development along SR 64 and Albritton, Post Plant, Vandolah and Fort Green-Ona Roads. Of these land uses, commercial development is most probable adjacent to the Ona Rural Community Center. Industrial development is most probable adjacent to the Ona Rural Community center or near the intersection of Vandolah and Fort Green-Ona Roads, where the combined presence of a Florida Power Corporation substation, the CSX Transportation, Inc. railroad, the Florida Gas Transmission natural gas pipeline, and two merchant power plants are under construction. Residential development is most probable in an isolated, sporadic fashion along any of the paved roads and along Vandolah and Albritton Roads where the reclamation plan calls for the creation of several lakes.

With respect to the 3,534 acres that would be reclaimed for agricultural use (e.g., pasture), it would be speculative to project the rate of or the probability that such lands would be converted to more intensive agricultural operations such as citrus groves or vegetable row-crop farms. It is well documented that the lands back-filled with sand or reclaimed by contouring overburden are well suited to citrus production, and the reclaimed settling areas are well suited for vegetable or row-crop production.

Consequently, it is more logical that these reclaimed upland areas, if readily accessible by roads, would be converted to more intensive agricultural uses than would the "no-mine areas of conservation interest," or converted to reclaimed wetlands simply due to the cost of land clearing and providing drainage.

Considerable portions of the post-reclamation vegetative conditions (see Figure 2.2-12) would be directed by IMC toward natural habitat. IMC has agreed to not disturb 4,901 acres of the most significant natural habitat on the site and to specifically reclaim/restore another 8,975 acres to specific habitat types. This means that approximately 65 percent of the site would consist of specific "targeted" natural habitat types.

As the fee simple owner of most of the Ona site, IMC has various options to utilize the property when mining operation is complete. These could include leasing for agricultural use, direct sale of property, establishment of agricultural development operations, and commercial, industrial or residential development. Portions of the property might be donated as habitat corridors. However, IMC believes the most likely scenario would be that a majority of the Ona site would be used as agricultural lands, with large areas remaining as undisturbed habitat, similar to current conditions.

As part of the proposed action, IMC would grant four conservation easements at the Ona site and one conservation easement on the adjoining Fort Green Southern Reserves site (see Figure 4.2-1). These conservation easements would cover about 20 percent of the property, and would be granted to the State of Florida and managed in perpetuity.

4.13.1.4.2 Conventional (IMC's Proposed Action)

The proposed reclamation technique has proven to be successful in restoring land for a variety of land use purposes that presently exist on-site and are likely to continue as reclamation is accomplished. Based on past experience, use of reclaimed areas for pasture, row crops and silviculture can be successfully accomplished. The most likely use scenario as expressed above is compatible with existing and anticipated conditions on and adjacent to the site.

4.13.2 IMC’s Original Area to be Mined Alternative

Land use impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. The floodplains associated with Horse, West Fork

DRAFT

Horse, and Brushy Creeks would be undisturbed. However, no other areas of ecological interest would be protected. Therefore, the post reclamation land use would be similar to the Proposed Action Alternative, but more of the site would be disturbed and reclaimed.

4.13.3 Natural Systems Group Recommended Areas of Conservation Interest

Land use impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. The floodplains associated with Horse, West Fork Horse, and Brushy Creeks would be undisturbed. The portion of the floodplain associated with Oak Creek that is south of SR 64 would also be undisturbed. Numerous areas of ecological interest would be protected. Therefore, the post reclamation land use would be similar to the Proposed Action Alternative, but more of the site would be undisturbed. The reclamation plan would be attempt to create habitat and stream corridors.

4.13.4 No USACE Jurisdictional Wetlands Impacts Alternatives

This alternative offers the benefit of not mining near the community of Ona. It would enhance the land use compatibility in and around Ona where mining areas would otherwise abut the community. Mining would be limited to less than 1,100 acres on the western side of Horse Creek, which would still have some impact on the relatively small number of homes located in that area. However, these impacts would be mitigated by the required set backs from residences and the relatively small acreage would limit the time the land would be actively mined. The mining impacts would be the same for these western boundary residences as with the proposed Ona Mine project.

4.13.5 No Action Alternative

No land use change would likely result in the vicinity of Ona under the No Action Alternative. Land use change under this alternative would be non-existent or minor, and adverse impacts would not be anticipated.

Under this alternative, it is conceivable the Ona site could be developed. Although limited in type and extent of development, ranchette-type development, similar to land use patterns on the western side of the property, could occur on the mine during the timeframe of the proposed mine.

4.14 AESTHETIC RESOURCES

From the adjacent roadways and aerial viewpoints, the Ona site is currently a mixture of pasture, natural upland, wetland, rangeland, forest, and agricultural uses. Large, contiguous natural systems are present along the floodplain of Brushy Creek and north of the community of Ona. Mining activities would alter the current views of the Ona site. Discussion follows on how the mining activities would impact the area.

4.14.1 Proposed Action Alternative

4.14.1.1 Mining Methods

Visual impacts created by the mining process would result in the removal of about three-quarters of the current vegetation at a rate that would average about one square mile per year. Visual impacts adjacent to SR 64 would occur around mining year 15. The property visible from Ona and from the Fort Green-Ona, Albritton, and Vandolah Roads would be disturbed in the last six to seven years of the mining phase of the project. Prior to reclamation, the changes in the viewshed would be similar to other active mines in the area. Most local travelers on the roadway network are accustomed to the mining activity that can be viewed from public right-of-way and since there are no visually significant areas on or near the mine site, no significant impact is expected.

4.14.1.1.1 Dragline Mining (IMC's Proposed Action)

Dragline mining would occur in the proximity of SR 64 and the three collector roads referenced above. Views of dragline mining activities would be more frequent along SR 64 because of the greater traffic along the highway and the extent of mining to occur along this road. Approximately 6.5 miles of highway frontage would be mined over the duration of the mine life, primarily along the north side of SR 64. Visual impacts would be similar to those presently experienced along SR 62, which is parallel to and north of SR 64. Impacts would be mitigated by roadside ditch and berms systems, setbacks, and the duration of mining activity along highway frontage. Because there are no visually significant areas or designated scenic resources, adverse impacts are not expected to be significant. Impacts to Fort Green-Ona Road, Albritton Road, and Vandolah Road are considered less due to the smaller areas along the roads that would be subjected to mining and the significantly fewer viewers traveling along these roads.

The draglines would be illuminated at night to provide a safe work place and to facilitate mining. The illuminated draglines would be noticeable whenever an uninterrupted line of sight exists between the dragline and the receptor. The lighting intensity is diminished because the dragline and mine operations lighting is focused to illuminate the active work areas such that only tangential beams of light reach off-site receptors. Also, light intensity diminishes rapidly with distance such that lighting of mining areas would be noticeable, but would most likely not be offensive, except potentially when mining occurs immediately adjacent to property boundaries. As mining progresses across the site and passes near adjacent residences, lighting would be noticeable to the nearby residents for only about three months.

IMC is requesting a waiver to Section 2.06.06A.01 of the Hardee County Land Development Code, which prohibits mining operations within 500 feet of residential structures.

4.14.1.2 Matrix Transport

4.14.1.2.1 Slurry Matrix Transport (IMC's Proposed Action)

Visual impacts from slurry matrix transport would be insignificant. Due to the low profile of equipment used for transport, views of matrix transport would be very infrequent and of limited duration.

4.14.1.2.2 Conveyor Transport

Visual impacts from conveyor matrix transport would also be insignificant for the same reasons as the slurry transport. Views of the low profile of conveyor matrix transport equipment would be very infrequent and of limited duration.

4.14.1.3 Plant Siting

4.14.1.3.1 IMC's Proposed Plant Location

Lighting at the proposed Ona Beneficiation Plant would be provided to ensure a safe working environment under federal mine safety and health administration rules. However, the beneficiation plant site would be approximately 500 to 600 feet from SR 64 such that the natural buffering between the plant and the road would significantly reduce the visibility of the plant during daylight and nighttime conditions.

The lighting impact to the few homes adjacent to the Ona site would be similar to other brightly lit facilities such as neighboring power plants, highway interchanges and ball fields. The lighting would be noticeable, but not objectionable, because all lights would be aimed at the working surfaces and not the adjacent lands.

4.14.1.3.2 Other Plant Locations

Two other plant locations are shown on Figure 2.2-3. Alternate Plant Site #1 is the same site that was previously proposed by MCC. It is located approximately 1.5 miles to the north, northwest of the community of Ona and is situated near the existing deep wells. It is a more remote location that would have little visual impact on the population in the Ona Mine area or to the community of Ona.

Alternate Plant Site #2 is located approximately 0.5 mile to the north, northwest of the community of Ona (within Area of Conservation Interest #11). This location would have more potential for adverse visual impacts than either the proposed site or the Alternate Plant Site #1 due to its proximity to the community of Ona, SR 64 and Fort Green - Ona Road. Visibility from the roads could be mitigated somewhat by landscaped berms along the right-of-ways, but light infiltration would impact the more densely populated area around Ona.

4.14.1.4 Sand and Clay Residuals Management

4.14.1.4.1 Conventional Settling (IMC's Proposed Action)

Because there are no visually significant areas on or near the mine site, no significant impacts to scenic lands are expected. The view of the landscape near the clay settling areas would be altered by the retaining berms surrounding the proposed clay settling ponds. Depending upon the height of these berms, they may possibly be seen from a distance along SR 64 until reclamation is completed.

4.14.1.5 Reclamation

The proposed reclamation and re-vegetation plan has specifically targeted land that can be developed to be positioned along public roadways and access points, thereby resulting in visible areas of woodland pastures, upland and wetland forests, rangeland, and marshes being visible following mining and reclamation. During the reclamation process the perimeter ditch and berm systems would continue to be in place and provide a visual barrier during reclamation activities. As the reclaimed lands mature, the scenic nature of the property is expected to be similar when compared to its current conditions.

4.14.1.5.1 Conventional (IMC's Proposed Action)

Unlike mining operations, reclamation earthwork and revegetation efforts are rarely conducted at night, such that nighttime visible impacts would not occur during this phase of the operation. Reclamation equipment would consist of low profile earth moving and grading equipment. Direct views of this activity from any public right-of-way would be very limited and of short duration. No adverse impacts are anticipated.

4.14.2 IMC’s Original Area to be Mined Alternative

Aesthetic impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. However, more of the site would be disturbed and reclaimed. Therefore, visual impacts may be over a longer period if the mine life is longer.

4.14.3 Natural Systems Group Recommended Areas of Conservation Interest

Aesthetic impacts associated with this alternative would be similar to those described for the Proposed Action Alternative. However, less of the site would be disturbed and reclaimed. Therefore, visual impacts may be less if the mine life is shorter. No USACE Jurisdictional Wetlands Impacts Alternative

Mining activities under the No USACE Jurisdictional Wetlands Impacts Alternative boundaries would result in a reduction of opportunities to view mining operations along SR 64 and in the mine vicinity. Existing views of wetland areas would maintain their current integrity (See Figure 2.1-5).

DRAFT

4.14.4 No Action Alternative

Under the No Action Alternative no mining or reclamation would occur on the Ona site, therefore no impacts are anticipated.

4.15 RECREATION RESOURCES

The Ona site is composed of privately owned land. There are no public recreation opportunities available at the Ona site due to liability considerations, which limit recreation opportunities to invited guests of the owners. The closest public recreation facility is Pioneer Park near Zolfo Springs (approximately four miles from the easternmost border of the Ona mine). Other nearby recreational facilities can be found in Zolfo Springs (approximately five miles from the eastern site boundary) and in Wauchula (approximately six miles from the eastern site boundary).

4.15.1 Proposed Action Alternative

4.15.1.1 Mining Methods

4.15.1.1.1 Dragline Mining (IMC's Proposed Action)

IMC proposes to reclaim 1,034.5 acres of mined lands as open water, predominantly in the form of lakes. The total post-reclamation area of open water is projected to be 1,065.1 acres.

There would be no direct adverse impact from the mining activities on recreational opportunities. There would be a beneficial effect of providing additional recreational opportunities with the lakes. These new lakes and any ancillary facilities are not likely to have an adverse economic impact on existing facilities because the nearest public recreational facility is approximately four miles from the eastern mine boundary. The existing recreational facilities would not experience an increase in use by employees involved with mining since many of them already work at the Fort Green Mine and because the employees would not need to relocate into the area.

4.15.1.2 Waste Sand and Clay

4.15.1.2.1 Conventional Settling Disposal (IMC's Proposed Action)

Due to the distance of the settling areas from the nearest public recreational facility near Zolfo Springs (approximately eight miles east of the settling areas), there would be no direct impacts to existing recreational facilities from the proposed conventional settling process. There would be no indirect impacts from this settling process due to the low number of employees involved and the employees having no need to relocate to the area. Without relocating to the area the employees do not become potential users of either the present public recreational facilities or any future recreational facilities provided through reclamation of the clay settling areas.

4.15.1.3 Reclamation

Recent local examples of recreational opportunities created through the reclamation process include the Peace River Park in Polk County and the Hardee Lakes project north of the Ona site, which would be the first lakes in Hardee County to become publicly available. The reclamation plan for the Ona site includes approximately 12 lakes that would cover approximately 1,034.5 acres, which would be located near public roadways and surrounded by a park-like landscaping (see the IMC CDA, NEB #6 Community Value NEB). Regardless of donation parties, favorable recreation opportunities are expected to occur in the area as a likely result from development of the Ona site.

4.15.1.3.1 Conventional (IMC's Proposed Action)

The conventional clay settling pond disposal process would not have any direct impacts on the recreational opportunities after reclamation has been completed since there is no geographic conflict in their proposed locations on the reclamation plan (see Figure 4.8-2). The settling ponds are positioned to allow for the lakes and recreational areas to be placed near public roads and to have public access.

4.15.2 IMC's Original Area to be Mined Alternative

Like the Proposed Action alternative, there would be no direct adverse impact from this alternative on recreational opportunities. There would be a beneficial effect of providing additional recreational opportunities through the development of lakes. These new lakes and any ancillary facilities are not likely to have an adverse economic impact on existing facilities because the nearest public recreational facility is approximately four miles from the eastern mine boundary. The existing recreational facilities would not experience an increase in use by employees involved with mining since many of them already work at the Fort Green Mine and because the employees would not need to relocate into the area. Natural Systems Group Recommended Areas of Conservation Interest

Like the Proposed Action alternative, there would be no direct adverse impact from this alternative on recreational opportunities. There would be a beneficial effect of providing additional recreational opportunities through the development of lakes. Although, the number of lakes developed may be less with this alternative than for the other two action alternatives. Any new lakes and ancillary facilities would not likely have an adverse economic impact on existing recreational facilities because the nearest public recreational facility is approximately four miles from the eastern mine boundary. The existing recreational facilities would not experience an increase in use by employees involved with mining since many of them already work at the Fort Green Mine and because the employees would not need to relocate into the area.

DRAFT

4.15.3 No USACE Jurisdictional Wetlands Impacts Alternative

This alternative would limit the mining area to less than 1,100 acres west of Horse Creek. This limitation would reduce the acreage available for reclamation and restrict the space available for creating lakes and open areas that could be used for public recreation in the future.

4.15.4 No Action Alternative

There would be minor impacts to usage of public recreational facilities due to loss of the low number of employees for the mining project. There may be some indirect impacts if the employees had to move their households out of the area to find employment elsewhere. This might result in reduced usage of the existing public recreation facilities.

The No Action Alternative would also remove the opportunities for the land to be reclaimed and redeveloped into space that would provide public recreational facilities and activities. There are no naturally occurring lakes in Hardee County and this alternative would eliminate the plans to develop approximately 12 lakes, totaling more than 1,000 acres, with some to be specifically designed for public access and recreation.

4.16 HISTORIC PROPERTIES

4.16.1 Proposed Action Alternative

The MCC studied the historical and archaeological resources at the Ona site in the 1970's. These resources were studied again by IMC in 1997, 1999, and 2000. The SHPO has concurred that none of the historic structures identified on the site are eligible for listing on the NRHP. Therefore, no additional research is required (see SHPO letters in Appendix C).

Although several archaeological sites were identified during the conduct of numerous surveys, only two of these sites were considered potentially eligible for listing in the NRHP. Site 8HR5 is an aboriginal site that has been scientifically mitigated (i.e., excavated) to the satisfaction of the SHPO (letter dated May 15, 2000, Appendix C) (PAR, 1982).

Site (8HR779) was identified and considered potentially eligible for listing in the NRHP (SAR, 1999). The SHPO concurred in their letter dated March 14, 2001; therefore, additional research is required for this site. IMC proposes to conduct Phase II testing to determine the eligibility of site 8HR779 for listing in the NRHP. If the site were determined eligible, IMC would proceed with data recovery from this site to mitigate any impact and to obtain concurrence from the SHPO that mining activities would not have an adverse effect. These activities and coordination under Section 106 of the NHPA would be completed prior to conducting any ground-disturbing activities in the area (IMC, 2002).

In the event that previously unidentified historic properties or human remains are found during earth disturbing activities, IMC would follow procedures established in their notification policy (IMC, 2002).

Therefore, the Proposed Action Alternative and any of the mining methods studied would not have a significant adverse impact on historic resources.

Coordination has been initiated with representative of the Seminole and Miccosukee Tribes. Therefore, impacts to historic resources of importance to these Nations have not been determined at this time.

4.16.2 IMC's Original Area to be Mined Alternative

Impacts to historic resources associated with this alternative would be similar to those described for the Proposed Action Alternative. Phase II testing would be conducted to determine the eligibility of site 8HR779 for listing in the NRHP. If the site were determined eligible, IMC would proceed with data recovery from this site to mitigate any impact and to obtain concurrence from the SHPO that mining activities would not have an adverse effect. These activities and coordination under Section 106 of the NHPA would be completed prior to conducting any ground-disturbing activities in the area (IMC, 2002).

In the event that previously unidentified historic properties or human remains are found during earth disturbing activities, IMC would follow procedures established in their notification policy (IMC, 2002).

4.16.3 Natural Systems Group Recommended Areas of Conservation Interest

Impacts to historic resources associated with this alternative would be similar to those described for the Proposed Action Alternative. Although fewer acres would be disturbed, site 8HR779 would be affected. Phase II testing would be conducted to determine the eligibility of site 8HR779 for listing in the NRHP. If the site were determined eligible, IMC would proceed with data recovery from this site to mitigate any impact and to obtain concurrence from the SHPO that mining activities would not have an adverse effect. These activities and coordination under Section 106 of the NHPA would be completed prior to conducting any ground-disturbing activities in the area (IMC, 2002).

In the event that previously unidentified historic properties or human remains are found during earth disturbing activities, IMC would follow procedures established in their notification policy (IMC, 2002).

4.16.4 No USACE Jurisdictional Wetlands Impacts Alternative

Impacts associated with the No USACE Jurisdictional Wetlands Impacts Alternative would be similar to those described for the Proposed Action Alternative.

4.16.5 No Action Alternative

No mining activities would occur at the Ona site under this alternative. Therefore, site (8HR779) would not undergo the phase II testing, and its' significance would remain undetermined. Furthermore, any remaining unidentified sites may be disturbed by development activities at the Ona site (e.g. agricultural conversion of land into groves or row crop operations) that are not regulated by cultural resources preservation laws such as the NHPA. Therefore, this alternative has the potential to adversely impact archaeological resources. No impacts to historic structures would occur.

4.17 PUBLIC HEALTH AND SAFETY

4.17.1 Proposed Action Alternative

As with any large project, there is the potential for public health and safety to be an issue. Four areas of concern relative to public health and safety include: 1) radiation exposure; 2) catastrophic dam failure; 3) on-site accident, and; 4) on-site preparedness. These concerns and IMC's proposed plan for prevention and/or response are described in the following sections.

4.17.1.1 Radiation

Soils contain uranium, radium, and a number of other radioactive elements derived from uranium. Uranium-238 is the parent of a chain of radioactive materials known as the Uranium Series. Uranium-238 decays to thorium-234 and this process of radioactive decay continues through 13 different radionuclides until a stable isotope (lead-206) is reached. Each different radionuclide exhibits different radiological characteristics, including different types and energies of radiation, half-life, and metabolic characteristics. These differences result in different potentials for radiation dose to humans.

From a potential health effect standpoint, the key members of the Uranium Series are Radium-226 and Radon-222. Radium-226 is generally recognized as the indicator radionuclide for potential radiological impacts from the phosphate industry. This is because of its long half-life and the types of radiation it emits. Radon-222, the immediate decay product of Radium-226 is an inert gas that can seep through soils and enter structures that are constructed on those soils providing the potential for its decay products (known as radon progeny) to build up in some structures. Polonium-210, one of the decay products of Radon-222, has been detected in elevated concentrations in the phosphate district and can be of concern because of the type of radiation it emits. All of these radioactive materials are known to cause adverse health effects at high concentrations. However, the concentrations of these radionuclides that have been observed in the central Florida phosphate district are close to normal background levels and are lower than concentrations that are known to cause adverse health effects.

The typical Florida resident receives a total dose of approximately 200 mrem of radiation each year from natural background (FIPR, 1986a). These natural background doses are considered safe and have never been shown to produce any adverse health effects. In fact, no adverse health effects have ever been shown to result from radiation doses much higher than the average natural background radiation doses. Only radiation doses that are many times the average natural background dose may produce adverse health effects (Roessler, 2002).

The potential for activities associated with phosphate mining to cause an increase in the risk of individuals being exposed to Radium-226 or Radon-222 levels above those that they would encounter without mining, has been studied for decades. Four primary areas of concern have been studied extensively. They include 1) drinking water contamination; 2) food chain contamination; 3) construction on reclaimed lands; and, 4) direct exposure of phosphate industry workers. In general, the results of the various studies show that, with the exception of construction on reclaimed lands, there is no increase in risk associated with any of these areas of concern. The following sections discuss the concerns and the results of the studies that have been conducted.

4.17.1.1.1 Drinking Water Contamination

As described in the Areawide EIS, the primary contaminant associated with water is Radium-226. This is a naturally occurring radioactive material with a very long half-life (1,600 years) that is produced as natural uranium decays in soil and rock. Different areas have greater amounts of uranium (and therefore Radium-226) than in other locations. Drinking water sources from rock formations with higher amounts of radium will likely have higher concentrations of Radium-226 than water from other sources. For example, the USGS found that public water supply samples in Iowa had concentrations of Radium-226 in excess of 16.9 pCi/L before treatment (USGS, 1998).

The USEPA as well as Chapter 62-550 of the F.A.C. (2000) established maximum contaminant levels (MCLs) for combined Radium-226 and 228 and for gross alpha radiation in drinking water. The MCL is a maximum permissible level of a contaminant that is not anticipated to cause adverse health effects when a human drinks it, over a lifetime of consumption and also takes into consideration feasible treatment technologies and monitoring capabilities. The MCL for combined Radium-226 and 228 is 5 pCi/L. The MCL for gross alpha is 15 pCi/L.

The USEPA estimates that the additional lifetime risk associated with drinking water containing 5pCi/L of Radium-226 and 228 is about one in 10,000. This means that if 10,000 people were to consume two liters of this water per day for 50 years, an estimate of one additional fatal cancer would likely occur among the 10,000 exposed individuals. According to the USEPA model, as the level of radium increases, so does the risk. For example, increasing the concentration of radium from 5 to 10 pCi/L would increase the lifetime risk from approximately one to two additional deaths per 10,000 individuals. The risk associated with consuming water containing 5 pCi/L of radium for one year is comparable to one chest X-ray (Maryland Department of the Environment, 2002).

Mean radioactivity values for water samples collected as part of the Areawide EIS are shown in the following table, and demonstrate the presence of naturally occurring radium in groundwater throughout central Florida (USEPA, 1978).

Central Florida Area Where Samples Were Collected	Lower Floridan Aquifer	Upper Floridan Aquifer	Surficial Aquifer System
Nonmineralized	1.4 pCi/L	5.1 pCi/L	---
Mineralized but Unmined	2.0 pCi/L	2.3 pCi/L	0.17 pCi/L
Mineralized and Mined	1.96 pCi/L	1.61 pCi/L	0.55 pCi/L

Source: USEPA, 1978

Pre-mining radiation concentrations in groundwater samples collected during the 1976 MCC EIS study, and as part of IMC's CDA process, are described in Section 3.7.3.2.1, and also show the existence of naturally occurring radium in the aquifers.

Relative to concerns about clay settling ponds, in 1975, a USEPA study stated, "*The total concentration of Radium-226 in every effluent discharge sample analyzed was less than 3.0 pCi/liter*" (USEPA, 1975). These findings were confirmed by the USGS who found that, "*Pond water had low gross alpha and Radium-226 concentrations and produced no impact on the surficial or Floridan aquifers. The high surface area of the clay particles effectively removes radionuclides from the process water*" (USGS, 1984).

In 1977 USEPA conducted a study of the effects of the phosphate industry on Radium-226 in groundwater in central Florida. The study concluded that there was no significant difference in dissolved Radium-226 concentrations in the water table aquifer between areas impacted by mining and those unmined areas of mineralization (USEPA, 1977).

The Florida State University (1987) found that concentrations of soluble Radium-226 in samples taken on the Suwannee River were higher in downstream stations remote from phosphate mining operations than for samples taken directly from the drainage of the phosphate district. Specifically, the researchers "…*could detect no significant difference in the radium concentration downstream from mining activities*." Similarly, Mitsch et al. (1984) reported that both Radium-226 and Radon-222 concentrations for samples taken from wells located in the vicinity of a phosphate mine in Aurora, North Carolina, were relatively low when compared to concentrations found elsewhere in the state.

More recently, the US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (1994) found that there was no pathway for human exposure to radiation through drinking water.

Even if the concentration of Radium-226 in drinking water did increase as a result of phosphate mining activities, the established drinking water standard would not likely be exceeded. Additionally, according to Dr. Roessler, only radiation doses that are many times the average natural background dose may produce adverse health effects. Therefore, as concluded in the Areawide EIS (USEPA, 1978) and the MCC EIS (1976), the potential for adverse human health effects from exposure to increased radiation in drinking water as a result of phosphate mining activities is minor.

4.17.1.1.2 Food Chain Contamination

As more and more reclaimed mined land are being used for agricultural purposes, the question arises as to the radionuclide content of crops grown on these lands for direct human consumption, as well as in beef when cattle have grazed on forage from these lands. The following sections describe the research available in these areas.

Crops grown on Reclaimed Lands

In 1986, Guidry, et al completed the study "Radioactivity in Foods Grown on Florida Phosphate Lands." The purpose of the study was to characterize and quantify levels of radionuclides in foods grown on phosphate lands, and to estimate the radiation dose to consumers of these foods. The results showed that radionuclide content of some foods, especially leafy vegetables, were higher if the crop was grown on reclaimed land versus control or non-mineralized land, but that the total quantities of radionuclides were small even under worst case conditions. A typical individual eating foods grown on reclaimed lands would experience a small percent increase in his total yearly radiation dose from all environmental sources combined. The total increase in intake of radionuclides from these foods was a small percent of the limits suggested by several scientific and regulatory authorities (Guidry, 1986).

In 1990, Guidry, et al., studied the radioactivity in foods grown on reclaimed mined phosphate lands in the central Florida phosphate district. This study was a follow up to previous research that looked at radioactivity in foods grown on a variety of land types including unmined and mined lands. The 1990 study, however, focused primarily on foods grown on reclaimed clay lands. The results of the study indicated, as in the initial study, that concentrations of Radium-226 and Lead-210 observed in foods grown on mined phosphate lands were statistically higher than concentrations of these radionuclides exhibited in foods grown on unmined phosphate lands (Guidry, 1990).

However, although the radioactivity concentrations measured in foods grown on mined phosphate lands were found to be statistically higher than in foods grown on other lands, the radiation dose to the consumers of these foods was found to be only a small fraction of the dose received by an average individual from other environmental sources of radioactivity. The study evaluated the worst case or maximum dose to a hypothetical person who obtains all of the foods sampled in this study from reclaimed clay lands and the remainder of their diet from the general food pool. This person was estimated to receive 19.1 mrem per year in committed effective dose equivalent from the ingestion of the radionuclides reported in this study. This is 2.7 mrem per year more than the estimated radiation dose to an individual who obtains all of their foods from lands unaffected by phosphate deposits or phosphate mining. Both of these dose levels are not considered to cause a significantly increased health risk (Guidry, 1990).

These findings were substantiated by a study conducted by the University of Florida and published by FIPR in 1996. This study showed that although phosphatic clay does contain elevated levels of radionuclides, these are not passed to plants and animals in the human food chain, and pose minimal risk to human or animal health (FIPR, 1996).

In addition to research regarding human health effects of crops or forage grown on reclaimed phosphate lands, studies have also been conducted to assess whether there are any potential health effects related to the use of phosphogypsum as an agricultural supplement.

In 1998, the University of Florida published a study called, “Impact of High Rates of Phosphogypsum on Radon Emissions and on Radioactivity and Heavy Metals in Soils, Groundwater, and Bahiagrass Forage.” For the study, large quantities of phosphogypsum were applied to crops to determine if there would be statistically significant measured differences in Radium-226 and Radon-222 in several resources including forage. Statistically significant differences were found. However, even with large quantities of phosphogypsum application radiation levels were low enough as to not pose a health risk. The researchers concluded that normal rates of phosphogypsum application, which would be much lower than the rates used for the study, also would not pose a significant health risk. Therefore, radionuclide uptake by foods grown on lands to which phosphogypsum has been added is minimal, and well within established dietary tolerances (FIPR, 1998a).

Livestock and Waterfowl

As described earlier, studies have shown that although phosphatic clay does contain elevated levels of radionuclides, these are not passed to plants and animals in the human food chain (FIPR, 1996).

In 1986 the Florida Audubon Society tested radioactivity levels in two groups of animals – aquatic reptiles (American alligators, softshell turtles, and Florida cooter turtles) and

DRAFT

terrestrial mammals (armadillos). Regardless of whether the bones were collected from mined, mineralized-unmined, or unmineralized land, the alligator bones contained low concentrations of radium. Additionally, the radium concentrations in the Armadillos showed no statistically significant differences between the sites. There was a difference in radionuclide content of turtles from mine-impacted areas relative to off-site specimens. However, the study concluded that the radiation levels found were low enough that consumption of the meat posed no significant human health risk (FIPR, 1986b).

Clay settling ponds are attractive to waterfowl, but also contain elevated levels of trace elements and radionuclides naturally associated with phosphate ore. The University of Florida, Department of Wildlife and Range Sciences conducted a study to determine the levels of nine radionuclides and 18 potential heavy metal contaminants present in the tissues and skeletons of four species of waterfowl that commonly inhabit wetland areas in the phosphate mineralized regions of central and northern Florida. Two of the species, wood ducks and mottled ducks, are also hunted for sport and consumption, and represent a potential route for radionuclides to enter into the human food chain. The study found that Radium-226 levels that are higher in the substrate of the settling ponds than in natural wetlands were reflected in elevated concentrations in the bones for all four species. Radium-226 levels in the soft tissues were consistently less than in the bones, and did not appear to represent an increased threat to humans eating the tissue (FIPR, 1986c).

In 2001, a University of Florida study concluded that consumption of beef that grazed on grassland or hay where phosphogypsum was applied, did not present a radiological health risk for humans. Thus, the effect on radionuclides in forage is not a major concern in the application of phosphogypsum to forage land (FIPR, 2001b).

Given the results of research regarding crops grown, or livestock and wildlife foraging on reclaimed phosphate lands, no adverse health impacts to the human food chain are anticipated.

4.17.1.1.3 Construction Considerations

In the mid-1970's, studies showed that indoor radiation levels in some homes in the central Florida phosphate district had levels of radioactivity higher than normal background levels. The highest levels were in homes built on land reclaimed from open pit phosphate mining operations, where the soil was naturally enriched in uranium (FIPR, 1988b).

The primary element of concern is radon. Radon is part of our environmental radiation exposure, and soils constantly emit radon. However, it has a tendency to build up in dwellings, and its levels can vary widely. Radon is a colorless, odorless, and tasteless gas, but it is radioactive.

Radon can enter a home through cracks in the home's foundation, dirt floors, pores in block walls, floor drains, and sumps. While radon usually enters through the basement or lower floors, it also circulates throughout the entire house. Radon levels can vary greatly, even in the same neighborhood. Primarily, radon levels depend on how easy it is for the radon to get into the home and the amount of radon in the ground under the home. Only through lack of ventilation and decay into the Radon daughter products does the exposure become an issue. Radon 222 alone is not a carcinogen.

It is widely accepted that most of the radioactive materials in phosphate ore and in various products and by-products of the beneficiation process tend to remain with the rock and the clay wastes. Therefore, the expected concentrations of radiation on the clay settling areas after reclamation would be higher than the existing conditions and other reclaimed areas of the site. Consequently buildings constructed on reclaimed settling ponds could potentially have higher indoor radon levels. However, radon gas emanation from clay ponds is minimal because of the high moisture content and low permeability. Radon gas has a half-life of 3.8 days and most of it becomes trapped in the water and clay. Reclaimed ponds are also poor places to construct a structure so indoor concentrations are not an issue. The highest levels of indoor radiation measured by the EPA and others in the 1970's were homes built on debris or tailing soils with high gas emanation rates. This type of soil with relatively high phosphate content is not produced through reclamation in current mining areas.

Because of concerns about naturally occurring radon levels in Florida, the state developed residential building code standards. These standards provide construction guidelines for passive radon control, such as radon-resistant foundation styles (ventilated crawl space, or an improved monolithic slab) (F.A.C. 9B-3, 1995). Additionally, techniques have been developed for reducing radon levels in existing buildings. Such techniques might include soil suction or sealing cracks, increasing house ventilation or house pressurization systems (USEPA, 2002c).

Research has shown that these techniques are effective in reducing radon levels in homes of varying construction techniques whether they are built on unmined or mined lands (FIPR, 1988b). Therefore, with appropriate mitigation measures adverse impacts associated with the construction of buildings on mined phosphate lands appears to be no greater than when constructed on unmined lands with naturally elevated radon levels.

4.17.1.1.4 Phosphate Worker Health

The health of workers within the phosphate industry was evaluated as part of the Areawide EIS, which found that between 1950 and 1969 there was no increase in mortality due to lung cancer in the Polk County where the phosphate industry was most active (USEPA, 1978). These findings were corroborated in a University of North Carolina study of male

DRAFT

phosphate industry workers between 1949 and 1978, which concluded "there is no consistent evidence that industry-specific exposures have been associated with mortality excesses in the Florida phosphate industry" (University of North Carolina, 1984). Nonetheless, in 1995 the University of Washington conducted a follow-up study that further assessed the health of the same group of workers that were studied in 1984. The findings of the study showed that:

- "Florida phosphate industry workers have the same or slightly lower total death rates than the national population.
- Male workers have experienced relatively small overall excesses in lung cancer mortality rates compared to national rates, but slightly lower lung cancer mortality rates relative to the local county rates.
- There have been slight, but consistent, elevations of motor vehicle accident mortality rates in both male and female workers.
- There is no consistent evidence linking lung cancer risk with employment in particular jobs or with specific phosphate industry workplace exposures" (University of Washington, 1995).

A 1998 study found that most workers employed by the phosphate companies receive training that is commensurate with the level of radiation hazard they encounter on the job. Worker exposure is limited to a mean annual total effective dose equivalent of 5,000 mrem per year. The study found it "extremely unlikely that this limit would be approached or exceeded" (FIPR, 1998b).

In addition, the study found that service industry workers are often not trained in radiation safety, and are therefore subject to public dose limit of a mean annual total effective dose equivalent of 100 mrem per year. This study found that with one exception, service industry workers on phosphate company sites or at remote service company locations, received doses far below the 100 mrem per year limit. The only exception was for workers involved in tank cleaning. The most significant component of the total effective dose equivalent for these workers is the inhalation dose. The study recommended that workers in areas of airborne dust or mist should be trained in the proper use a NIOSH/MSHA-approved respirator (with a proper fit), and encouraged to use them (FIPR, 1998b).

Given the findings of the 1998 study and the repeated findings that there is no evidence linking lung cancer risk with employment in the phosphate industry, no adverse impact on worker health or safety from radiation exposure is anticipated.

4.17.1.2 Catastrophic Dam Failure

The potential for catastrophic dam failure is taken into consideration when siting clay settling areas. Of particular concern is the size and location of an impoundment relative to adjacent property owners. IMC is required to conduct a detailed failure analysis during the FDEP permitting process for each dam prior to construction. All of the settling area dams would be designed in accordance with Chapter 62-672, F.A.C. by a licensed professional geotechnical engineer experienced with dam construction. IMC has recognized that the presence of above grade dikes adjacent to Horse and Brushy Creeks is a public concern. IMC has stated that the procedures for the construction, operation, and reclamation of clay settling areas would exceed the requirements of Chapter 62-672, F.A.C., which are designed to minimize the possibility of discharge from settling areas into the environment that would not meet discharge standards. With a design that meets or exceeds Chapter 62-672, F.A.C., the possibility of impacts is remote because: 1) of the low probability of failure; and, 2) there is little to no development adjacent to or down-gradient of the settling areas. The greatest concern would be a potential to flood SR 64 if a settling area dam should fail.

4.17.1.3 On-Site Accident

The second area evaluated addressed an on-site accident from the industrial processes. A review of the reagent properties to be used as part of the beneficiation process and the expected storage volumes of each was considered. This information was used to evaluate the potential impacts of a catastrophic tank failure both on-site and off-site. All aboveground storage tanks would be permitted as required by Chapter 62-761, F.A.C., and other applicable state and federal rules, which include secondary containment, as appropriate. As required by permitting, spill prevention plans and containment systems would be prepared by IMC in accordance with applicable regulatory programs.

4.17.1.4 On-site Preparedness

The third area of safety was to evaluate the expected on-site safety plan in order to address the preparedness of on-site employees to react to an accident as well as the planned coordination and communications with police, fire, EMS, etc.

Construction, inspection, and maintenance of the settling area dams would be performed by IMC in accordance with FDEP requirements specified in the F.A.C., Chapter 62-672 (as recently amended), as well as all other applicable local, state and federal requirements.

Selection of dam sites would be based on factors such as topographic relief, avoidance of wetlands or floodplains, location of roads, out-parcels, proximity to the beneficiation plant and/or mine access corridors. Sites would need to be at least 400 acres in size, in a

DRAFT

generally rectangular shape, to provide the minimum dam length for a given storage volume.

Proper access and toe roads would be constructed and maintained to facilitate adequate dam inspections. Grass on the dams would be maintained to prevent erosion and mowed to allow visibility for inspection. Supervision of safe freeboard levels is a requirement of all inspections. All findings would be reported in compliance with Chapter 62-672 (F.A.C.).

IMC employs various levels of technically competent personnel to perform periodic inspections and maintenance of retaining dikes:

1. A Mine Waste System Operator (WSO) would inspect all dam operations at least once each 8-hour shift, resulting in a minimum of 3 inspection times a day. The inspection report would be provided to the Mine Shift Supervisor and any conditions that needed special attention would be reported to the Mining Superintendent.

2. IMC has three full time dam inspectors who are responsible for dam safety and operational compliance with regulations. These technicians would conduct a detailed inspection of every settling area dam every week, each working a schedule of eight hours per day, five days per week. Their reports would be filed with the Geotechnical Engineer and would be available for periodic inspection by FDEP and Hardee County Inspectors. The reports would be the basis of a monthly report to management covering the condition of all of the company's settling areas.

3. A staff Geotechnical Engineer would conduct an inspection and prepare a report to document the condition of all settling area dams each month. This report would contain recommendations for the correction of deficiencies. The inspection reports would be filed with mine and management personnel and would be available for periodic FDEP and Hardee County inspection. Mining Leaders would submit a response to the Geotechnical Engineering Department detailing actions planned or implemented. The Engineer and/or the dam inspectors would follow up, or provide assistance as needed in order to ensure all corrections are completed in a timely manner.

4. A qualified Geotechnical Engineer, P.E. would annually conduct an inspection and document the condition of all settling area dams. These reports would be filed with IMC management, FDEP and Hardee County.

All IMC dam inspectors and Geotechnical Engineers would be expected to receive annual refresher training to review and reinforce good inspection practices.

Another tool that would help to evaluate the safe function of a dam would be the installation and monitoring of piezometers to ensure the dams operate as designed. Each dam would have a number of piezometers, which would provide a measure of the dam's internal pressure. These piezometers would be read by dam inspectors on a weekly basis, and reviewed by the Geotechnical Engineers, to evaluate how well the dam is functioning. Rising pressures, indicated by piezometer levels, could provide early indication of a developing problem, thus, allowing detection while there is ample time for corrective action. These piezometers would be installed, monitored, and maintained for the life of the dam.

As part of the permitting process for each dam an Emergency Response Plan would be prepared and submitted to the FDEP and local government. This plan would detail the procedures that must be taken in the event of an emergency situation that could result in a significant release of fluid from a dam. The Emergency Response Plan includes procedures for the notification of 911 to summon emergency services, as well as notification of neighbors, state and local regulators, contractors, and appropriate IMC personnel. The plan would also include an inundation map, which would show the potential direction of discharge and what properties and/or roads could be impacted in order to assist emergency personnel and ensure safety for both local residents and mine personnel. These procedures would be readily available at every mine location so that they could be quickly implemented in the event of an emergency.

4.17.2 IMC's Original Area to be Mined Alternative

Radiation impacts associated with this alternative would be similar to those described for the Proposed Action Alternative.

4.17.3 Natural Systems Group Recommended Areas of Conservation Interest

Radiation impacts associated with this alternative would be similar to those described for the Proposed Action Alternative.

4.17.4 No USACE Jurisdictional Wetlands Impacts Alternative

In general, the types of impacts and mitigation for the No USACE Jurisdictional Wetlands Impacts Alternative would be similar to those described for the Proposed Action Alternative. However, because of the reduced size of the mining operation fewer dams would be constructed, thus, reducing the potential for a catastrophic failure.

4.17.5 No Action Alternative

No mining activities would occur at the Ona site under this alternative, therefore, there would be no impacts relative to public safety.

DRAFT

4.18 ENERGY REQUIREMENTS AND CONSERVATION

4.18.1 Proposed Action Alternative

The regional electrical demand would not change over the life of the mine with an average demand of 75 megawatts (MW) projected. The electrical power supply for the Fort Green Plant and mine currently comes from Florida Power Corporation and from surplus power from generating facilities at IMC's South Pierce plant. Four phases of operation are expected for the Ona Mine. Energy requirements for the Ona Mine are shown in Table 4.18-1.

No natural gas, fuel oil, or coal would be used during the operation of the Ona Mine and plant for electric power generation. No on-site generation is planned for the Ona Mine or beneficiation plant.

The primary electrical power supplier for the Ona site would most likely be Florida Power Corporation. However, deregulation of the power industry, and construction of new power plants may provide a more economical power supplier. Surplus power from IMC's South Pierce plant may be exported to Tampa Electric Company, or an electrical transmission or distribution line may be established to Ona. It should be noted that there are two new power plants under construction in the Ona area in the next few years to supply wholesale power; which could potentially supply the power for this project.

Energy conservation is an on-going consideration at IMC since the cost of energy is a significant part of the total operating cost. Electric motors, transformers and pumping systems are designed, purchased, and installed to conserve energy. IMC has stated that the number of access corridor crossings at the Ona site have been requested in order to keep the pumping distance to a minimum, thus, conserving energy.

4.18.2 IMC's Original Area to be Mined Alternative

Energy requirements associated with this alternative would be similar to those described for the Proposed Action Alternative. However, the total amount of energy consumed for this alternative would be slightly more since more acres would be mined.

4.18.3 Natural Systems Group Recommended Areas of Conservation Interest

Energy requirements associated with this alternative would be similar to those described for the Proposed Action Alternative. However, the total amount of energy consumed for this alternative would be slightly less since fewer acres would be mined.

4.18.4 No USACE Jurisdictional Wetlands Impacts Alternative

Under the No USACE Jurisdictional Wetlands Impacts Alternative, the pattern and type of energy consumption and conservation measures would be similar to those described for

DRAFT

the Proposed Action Alternative. However, since the area mined under this alternative is 1,122 acres versus 20,676 acres for the Proposed Action Alternative, the total amount of energy consumed for this alternative would be considerably less.

4.18.5 No Action Alternative

No mining activities would occur at the Ona site under this alternative, therefore, there would be no energy consumption associated with mining.

4.19 NATURAL OR DEPLETABLE RESOURCES

4.19.1 Proposed Action Alternative

Phosphate is a natural, non-renewable resource that is obtained by mining phosphate-containing minerals. Under this alternative, the phosphate ore currently located in the subsurface within the designated mining areas would be removed. Since phosphate ore is a depletable resource, once the mining process is completed, this resource would no longer be available within the mined areas.

Nonetheless, as discussed in Chapter 1, there is no substitute for phosphate, and because of the important role of phosphate-based fertilizers in sustaining high levels of agricultural production, phosphate mining and processing will continue to be a necessary and important industry. The US is the largest producer of phosphate in the world, while Morocco and China rank second and third, respectively.

Florida’s phosphate industry is one of the major sources of phosphate fertilizer in the world because the US has the transportation and industrial infrastructure needed to produce and export the product. Additionally, the Florida phosphate deposit is one of the most economically accessible deposits in the world because a substantial layer of phosphate is only 15 to 50 feet below a soft overburden. Because of the economic attractiveness of the Florida phosphate deposits and the existence of transportation infrastructure and nearby fertilizer plants, Florida is presently providing approximately 75 percent of the nation’s supply of phosphate fertilizer and about 25 percent of the world’s supply (FIPR, 2001a).

4.19.2 IMC’s Original Area to be Mined Alternative

Impacts to natural or depletable resources would be similar, but slightly greater, for this alternative as for the Proposed Action Alternative. At the same time, to maintain a constant supply of phosphate rock, the impact of mining at other areas would be slowed down under this alternative.

4.19.3 Natural Systems Group Recommended Areas of Conservation Interest

Impacts to natural or depletable resources would be similar, but slightly less, for this alternative as for the Proposed Action Alternative. At the same time, to maintain a constant supply of phosphate rock, the impact of mining at other areas would be increased under this alternative.

4.19.4 No USACE Jurisdictional Wetlands Impacts Alternative

As with the Proposed Action Alternative, upon the completion of the mining process, the phosphate resource would no longer be available within the mined areas. However, the size of the mining area is less under this alternative, therefore, the impact on depletable resources would be less. However, the demand would remain the same, and like the No Action Alternative, other reserves would need to be mined to meet that demand.

4.19.5 No Action Alternative

No mining activities would occur at the Ona site under this alternative, therefore, the phosphate resources would be lost. The demand for phosphate would not diminish; therefore, other reserves would need to be mined in order to obtain the resource. Once the site is developed for other uses, recovery of the phosphate reserves could be economically prohibitive. Therefore, this alternative would have an adverse impact on the availability of phosphate.

4.20 SCIENTIFIC RESOURCES

The only scientific resource located on or adjacent to the Ona site is a USGS surface water station. The USGS maintains a gauging station on Horse Creek at SR 64 (Station #02297155), which is shown as Station #1 on Figure 3.5-1. This location is at the southern property boundary of the Ona site. No mining is proposed in the immediate vicinity of the gauging station. The station would be buffered from mining by the 100-year floodplain of Horse Creek, which is proposed to remain undisturbed. Therefore, no impact to the gauging station would occur as a result of any of the alternatives.

4.21 NATIVE AMERICANS

There are no Native American lands in Hardee County. The closest reservations owned or managed by Native American interests in the region are in Tampa, Florida (approximately 45 miles to the northwest), and in Brighten, Florida (approximately 58 miles to the southeast). Evaluation of environmental impacts to Native Americans could be established if the project was affecting a Native American reservation. Coordination has been initiated with representative of the Seminole and Miccosukee Tribes.

Data from the 1990 US Census and the 2000 US Census shows that in Hardee County there were 69 American Indians in 1990 and 184 American Indians in 2000. Even though this shows a significant increase in the American Indian population in the county, it also shows that they continue to compose less than one percent of the county's population. In 1990 there were only seven American Indians in the vicinity of the Ona site (Census site

DRAFT

9703, Block Group 5 and Census site 9704, Block Group 5; see Table 3.12-7). It is not likely that the American Indian population has grown significantly in the Ona area since most of the minorities in Hardee County are concentrated closer to Wauchula and the services located there.

4.22 REUSE AND CONSERVATION POTENTIAL

4.22.1 Proposed Action Alternative

Based on the available records, IMC has been able to trend its water consumption down over the past decade. As described in the CDA, the reduction in water consumption has been due to the innovative water reuse and conservation techniques that has been developed at IMC's mines in Hillsborough and Polk Counties. The IMC proposed action suggests that the Ona Beneficiation Plant would be at least as water-efficient as any existing operation. The potential conservation techniques would include: reuse of mine process water; stormwater capture; reduction of water consumption during the construction and operation of the proposed Ona Mine and Beneficiation Plant; and, if available, use of reclaimed water.

Water conservation measures proposed for the Ona Mine would be directed toward shifting water use from the FAS to surface and recycle water. To implement this plan, the water conveyance systems between the south Fort Green Mine and the Ona Mine would be interconnected. In addition, the following steps would be taken:

1. Construction and maintenance of water storage capacity within the recycle system. This allows the capture of more water during the rainy season for use during dry periods.

2. The use of surface waters in plant areas previously supplied by the FAS well water.

3. Reduction in the use of sealing water wells for matrix pumps.

IMC proposes to participate with Hardee County to achieve the state-mandated 30 percent recycling goal by recycling solid waste in lieu of depositing all solid waste in the Hardee County landfill. Independent of Hardee County's efforts, IMC would recycle used steel and plastic pipes, rebuild electric motors, and recycle used motor oil, antifreeze, hydraulic oils and lubricants, batteries, and spent parts washing solvent. Depending upon the recycling services available from Hardee County, IMC may also recycle newspaper, white paper, cardboard boxes, and other domestic recyclables such as aluminum cans.

4.22.2 IMC's Original Area to be Mined Alternative

The impacts of this alternative on reuse and conservation potential are similar to those described for the Proposed Action Alternative.

DRAFT

4.22.3 Natural Systems Group Recommended Areas of Conservation Interest

The impacts of this alternative on reuse and conservation potential are similar to those described for the Proposed Action Alternative.

4.22.4 No USACE Jurisdictional Wetlands Impacts Alternative

Conservation measures similar to those described for the Proposed Action would be implemented by IMC for this alternative. Therefore, similar consequences could be anticipated.

4.22.5 No Action Alternative

Under this alternative the Ona Mine would not be developed. Conservation measures would not be implemented by IMC. Although future use of the site is difficult to predict, should the site be developed for residential or urban uses, conservation measures associated with those projects may be less effective than IMC's proposed measures. However, if the area is not developed no impacts would result.

4.23 URBAN QUALITY

Evaluation of potential impacts to urban quality would be conducted if the project were affecting an urban area. The US Census defines an urbanized area as an incorporated place and adjacent densely settled surrounding area that together has a minimum population of 50,000. The closest urban areas are Lakeland in Polk County (approximately 39 miles to the north of Ona) and the Sarasota-Bradenton area (approximately 40 miles to the west of Ona). The project is located in a sparsely populated rural and agricultural area. Since the project area is not urban, no adverse impacts are anticipated as a result of any of the alternatives.

4.24 SOLID WASTE

4.24.1 Proposed Action Alternative

The Ona site is not expected to be a large generator of solid waste. The disposal of the estimated 500 pounds of solid waste per day would be by commercial vendor transport to the local landfill.

The solid waste generated excludes the sand and clay residuals used in backfilling mined land as part of the land reclamation process. Also excluded from this discussion are scrap steel, pipe, and other industrial materials, all of which are sold as scrap for recycling. Spent mobile equipment fluids (e.g., waste motor and hydraulic oils, power steering fluids, and anti-freeze), batteries, and tires are collected by vendors such as Safety-Kleen® and recycled, as are all non-aqueous solvents (e.g., mineral spirits-based parts cleaners). The five operating draglines would generate about 400 drums per year of waste-grease, which is a non-hazardous material that is burned off-site at an approved facility for energy recovery.

IMC intends to rely upon Polk County to provide off-site disposal of non-hazardous solid waste during the time-period when the Fort Green Beneficiation Plant is operational. Thereafter, IMC intends to rely upon Hardee County to provide for off-site disposal of non-hazardous solid waste during the time-period when the Ona Beneficiation Plant is operational. Both Counties' Comprehensive Plan Solid Waste or Public Facilities Elements indicate capacity exists, or would exist in the future, to provide this service to IMC.

At the existing Fort Green and proposed Ona Beneficiation Plants, the solid waste stream would consist of the domestic solid waste generated by the mine employees, office trash, and trash from the mine maintenance shops (e.g., parts boxes, shrink wrap, etc.). Solid waste would be stored at designated locations in the complex and prior to collection, in commercial dumpsters. The average daily volume of the solid waste to be generated, exclusive of the recycled items, would approximate 500 pounds per day.

As described earlier, IMC proposes to participate with Hardee County to achieve the state-mandated 30 percent recycling goal by recycling solid waste in lieu of depositing all solid waste in the Hardee County landfill. Independent of Hardee County's efforts, IMC would recycle used steel and plastic pipes, rebuild electric motors, and recycle used motor oil, antifreeze, hydraulic oils and lubricants, batteries, and spent parts washing solvent. Depending upon the recycling services available from Hardee County, IMC may also recycle newspaper, white paper, cardboard boxes, and other domestic recyclables such as aluminum cans.

4.24.2 IMC’s Original Area to be Mined Alternative

Solid waste impacts of this alternative would be similar to those described for the Proposed Action Alternative.

4.24.3 Natural Systems Group Recommended Areas of Conservation Interest

Solid waste impacts of this alternative would be similar to those described for the Proposed Action Alternative.

4.24.4 No USACE Jurisdictional Wetlands Impacts Alternative

Under this alternative, solid waste impacts would be similar in nature to those described for the Proposed Action Alternative. However, because the scale of this alternative is less than the proposed action, the scale of the impacts would also be less.

DRAFT

4.24.5 No Action Alternative

The No Action Alternative would result in a reduction of 500 pounds of solid waste generated in Polk and Hardee Counties. This amount is insignificant in comparison to the volumes of waste generated and disposed of daily in each county.

4.25 DRINKING WATER

4.25.1 Proposed Action Alternative

The Ona Mine would not use public water. Potable water demand would be met through an on-site potable well installed into the IAS capable of producing the estimated demand of up to 24,000 gallons per day. The Ona Mine would not generate sufficient demand in terms of quantity to warrant the extension of distribution lines to the project site. The population served could be as much as 400 people on a full-time equivalent basis.

The drinking water well would be located near the beneficiation plant and associated support buildings. The county health department would perform a sanitary survey of the proposed well location and make any necessary adjustments in location. The water treatment plant is planned to consist of only chlorine disinfection, and thus, would not generate any plant wastes. Although the plant would be designed to allow for operation from a generator, there is no permanent source of standby power planned for the system. Finished water storage would be in a 1,200-gallon hydropneumatic tank with a useful volume of 600 gallons. The distribution system would consist of about 4,000 feet of piping operating between 30 and 80 psi. The distribution system would not be in any area where there is documented evidence of the presence of petroleum products in the groundwater.

4.25.2 IMC's Original Area to be Mined Alternative

The impacts of this alternative on drinking water would be similar to those described for the Proposed Action Alternative.

4.25.3 Natural Systems Group Recommended Areas of Conservation Interest

The impacts of this alternative on drinking water would be similar to those described for the Proposed Action Alternative.

4.25.4 No USACE Jurisdictional Wetlands Impacts Alternative

Under this alternative, impacts to drinking water supply would be similar in nature to those described for the Proposed Action Alternative. However, because the scale of this alternative is less than the proposed action, the scale of the impacts would also be less.

4.25.5 No Action Alternative

In general, no adverse impacts to drinking water supply would occur under this alternative.

4.26 CUMULATIVE IMPACTS

As part of the NEPA process, direct, indirect, and cumulative impacts are assessed as to their magnitude, location, duration, reversibility, frequency, and their effect on the long-term productivity of any resources. Direct and indirect effects were described earlier in this EIS. CEQ regulations implementing the NEPA require federal agencies to analyze the cumulative effects of their actions on the environment. Guidance developed by the USEPA (1999), and the CEQ (1997) describes the appropriate scope and approach for assessing cumulative impacts associated with a given action. Cumulative effects on the human environment are defined by CEQ regulations as:

> *"…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (Title 40 CFR §1508.7)."*

Some actions may result in individually minor impacts, that when looked at in the context of other actions is collectively significant. Cumulative effects are not wholly different from the direct or indirect effects of an action. Cumulative effects are merely a way of placing seemingly isolated or insignificant direct and indirect effects in context with respect to overall impacts, both over time and over a larger geographic area than that evaluated for direct and indirect effects. For example, drainage projects done in an incremental manner can create significant downstream impacts on both the quantity and quality of water. Or, historical loss of wetlands in a watershed makes removal of remaining wetlands cumulatively more significant. Some concepts associated with cumulative impacts are:

- Cumulative impacts are triggered by impacts to environmental resources that function as integral parts of a larger system (natural, economic, cultural or social).
- Since the resource functions may be removed in both distance and time, cumulative impacts to the larger system may be 'invisible' to standard environmental studies that examine only the immediate impacts of an isolated project.

Therefore, an examination of secondary and cumulative effects should focus on the functional relationships of resources within larger systems. If these relationships are understood, then conclusions about a project's likely cumulative impacts to the overall system should be possible. A reviewer can determine which resources are cumulatively affected by considering whether:

1. The resource is especially vulnerable to incremental effects;
2. The proposed action is one of several similar actions in the same geographic area;

3. Other activities in the area have similar effects on the resource;
4. These effects have been historically significant for this resource, and;
5. Other analyses in the area have identified a cumulative effects concern.

This section describes potential cumulative impacts associated with three alternatives that were studied in detail in this EIS. The section identifies other actions that could impact the Ona Site and, when possible, provides a qualitative or quantitative discussion of the potential cumulative impacts of the alternatives and the other actions. Some effects are expressed in quantitative terms and others in qualitative terms. For the Proposed Action Alternative, every mining process activity (e.g., mining, matrix transport) and its different option(s) (e.g., slurry transport, conveyor transport) are discussed for each resource discipline (e.g., vegetation, surface water hydrology).

4.26.1 Background

In 1990, seven mining companies operated 19 mines in Polk, Hardee, Hillsborough, and Manatee Counties and produced about 40 million tons of marketable phosphate rock. Between 5,000 and 6,000 acres were mined to recover this volume of product. Phosphate rock produced prior to this time frame was converted into fertilizer at locations worldwide because of favorable economic conditions. However, Florida's phosphate rock market share peaked in 1980 when the US dollar was weak, but soon declined when a strong US dollar resulted in a marked overseas cost disadvantage for Florida producers (IMC, 2002).

By the year 2000, two decades of federal government policies to maintain a high value US dollar, combined with other global trends in the fertilizer markets, resulted in the transformation of the Florida phosphate companies into integrated producers (i.e., mine and concentrate/fertilizer plant operators). Currently, there are three integrated producers (e.g., IMC, CF Industries, Inc., and Cargill Fertilizer, Inc.); one mining company (e.g., Agrifos); and two chemical companies (e.g., FHLP/Cargill., and US Agri-Chemicals, Inc.). Phosphate rock production has decreased to nine mines operated by five companies. This is the level required to supply only Florida and gulf-coast (e.g., Texas and Louisiana) concentrate/fertilizer plants. During the past decade, two new mines opened, eleven mines closed, one concentrate/fertilizer plant closed, and no new concentrate/fertilizer plants opened (IMC, 2002).

Absent a major and unexpected world-scale event, this consolidation will be complete by the year 2010 when three integrated producers (e.g., IMC, CF Industries, Inc., and FHLP/Cargill Fertilizer, Inc.) will mine land in Hillsborough, Polk, Hardee, DeSoto, and Manatee Counties to provide phosphate rock feedstock for their own concentrate plants, and IMC will likely continue supplying phosphate rock to US Agri-Chemicals, Inc. Production of phosphate rock and fertilizer will vary on a short-term basis but is expected

DRAFT

to remain relatively constant on a long-term basis. Government agencies predict phosphate rock production between 2000 and 2010 of about 30 million tons per year from central Florida mines, which would be produced by mining between 3,500 and 4,500 acres per year. This level of production can only be met if IMC's Ona and Pine Level Mines, and FHLP/Cargill's Hardee County Mines, can open to offset lost production at four mines that are projected to close. Nine mines operated by four companies are likely to be operating in 2010 (IMC, 2002).

Government agencies project the decade between 2010 and 2020 will also result in production of about 30 million tons per year from central Florida mines, which will be produced by mining between 4,000 and 5,000 acres per year. One mine will likely close during this decade. It is not possible to project if this mine will be replaced. After 2020, government agencies project phosphate rock production will decrease to about 20 million tons per year unless new mines, not yet identified, are developed. By the year 2030, production will drop to less than 15 million tons per year. At these rates of production, not more than 3,000 to 4,000 acres per year would be mined. Of course, the most likely candidate sites for development of new mines are large tracts of lands in DeSoto, Hardee, and Manatee Counties that lie adjacent to or between lands within the active mines (IMC, 2002).

Four government agencies have published cumulative impact assessments during the past 20 years. In 1980, the USEPA published an Areawide EIS that assessed direct, indirect, secondary and cumulative impacts of various mining scenarios and various agency-permitting scenarios, on the natural and human environments of central Florida. The Areawide EIS included all of the mines that were currently operating or that were likely to be built (e.g., IMC's Ona and Pine Level Mines and FHLP/Cargill's Hardee County Mines), and concluded that mining would not result in unacceptable adverse impacts provided a specific suite of permit conditions were imposed on future mining operations. IMC's Proposed Action Alternative at a minimum incorporates these conditions, and for some resources (e.g., wetland preservation and creation) exceeds the recommended conditions (IMC, 2002).

IMC proposes to mine and reclaim the Ona site, as described in Chapter 2.0 of this EIS. IMC has designed the mine plan to avoid, or minimize and mitigate, all primary and secondary adverse impacts as such impacts are deemed adverse by FDEP, SWFWMD, USACE, USEPA, and Hardee County regulations. By definition, if the primary and secondary site-specific adverse impacts have been avoided, or minimized and mitigated, then there are no material cumulative impacts (IMC, 2002).

4.26.2 Cumulative Impact Assessment Approach

Cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected. Environmental impacts are often evaluated from the perspective of the proposed action. Analyzing cumulative impacts requires focusing on the resource, ecosystem, and human community that may be affected and developing an adequate understanding of how the resources are susceptible to impacts. For a cumulative impacts analysis to help the decision maker and inform interested parties, it must be limited through scoping to impacts that can be evaluated meaningfully. The boundaries for evaluating cumulative impacts should be expanded to the point at which the resource is no longer affected significantly or the effects are no longer of interest to affected parties (CEQ, 1997).

The resources and ecosystem components with the greatest potential to be cumulatively affected by the Proposed Action or its alternatives, when combined with other actions within the study area, were determined by analyzing the direct and indirect impacts described in Sections 4.1 through 4.25, as well as the results of the scoping process and literature. Several questions from CEQ's and USEPA's guidelines (1997; 1999) were answered as part of this evaluation, they include:

1. Is the resource especially vulnerable to incremental impacts?
2. How is the proposed action similar to other recent or proposed actions in the same area?
3. Do different kinds of recent or proposed actions have the potential to impact the environmental in a similar way?
4. Will the proposed action, in combination with other actions, affect resources that are of particular concern?

This analysis resulted in biological resources, water resources, and socioeconomic resources being identified as warranting evaluation for cumulative impacts.

4.26.2.1 Geographic and Time Boundaries

4.26.2.1.1 <u>Geographic Boundaries</u>

The geographic boundary used for the cumulative impact assessment varies from resource to resource. For the assessment of cumulative impacts associated with biological resources, water resources, and land use change, the Peace River basin was used. This was done to allow the evaluation of phosphate mining over time, and since mining activities have been conducted throughout the basin, it made sense to look at the entire basin. The geographic boundary used to assess impacts on socioeconomic resources is Hardee County and the central Florida region for economic impacts.

4.26.2.1.2 Timeframe

The timeframe selected for the cumulative impact analysis was 1975 to 2025. The analysis focused on three points during that timeframe, 1975, 2000, and 2025. The starting point of 1975 was selected because it corresponds to the conduct of the Areawide EIS (USEPA, 1978), and there is good data available for that timeframe. Additionally, the data for 2000 and projections for 2025 are also good, and these time points correspond to local planning timeframes.

4.26.2.2 Past, Present, and Reasonable Foreseeable Future Actions

4.26.2.2.1 Actions at other Mining Sites That Could Have Potential Cumulative Impacts

One of the challenges associated with this cumulative impact assessment was acquiring data about past reclamation since existing mapping did not specify post-reclamation land cover but just classified lands owned by mining companies as "mining" or "extractive". The land cover associated with reclaimed areas was important to fully evaluate cumulative impacts. As part of this analysis, data was collected from all of the mining companies with past, current, or proposed activities in the Peace River basin. These data included future mining plans, as well as past, current and future reclamation plans. These land cover data were mapped for the years 1975, 2000, and 2025 and are shown on Figures 4.26-1, 4.26-2, and 4.26-3, respectively.

4.26.2.2.2 Actions Near the Ona Site

In addition to other mine activities, other recent past, current or foreseeable future projects within a one-mile radius of the Ona site boundaries were also included in the assessment of cumulative impacts. Hardee County provided copies of the building permits issued for projects within the county. Two of those projects were within the study radius. They include a new power plant at Vandolah Road, and an assisted living facility on Albritton Road. There were other projects closer to the municipal areas of Wauchula and Zolfo Springs, but they were not within the study area.

4.26.2.3 Methodology

As described by USEPA in their document, *Consideration of Cumulative Impacts in EPA Review of NEPA Documents* (USEPA, 1999), the adequacy of a cumulative impact analysis depends on how well the analysis considers impacts that are due to past, present, and reasonably foreseeable actions. The analysis should include the use of trends information and interagency analyses on a regional basis to determine these combined effects. NEPA documents should only consider those past, present, and future actions that incrementally contribute to the cumulative effects on resources affected by the proposed action. Actions affecting other resources, or with cumulatively insignificant effects on the target resources, do not add to the value of the analysis.

DRAFT

The methodology employed to assess the cumulative impacts associated with the proposed Ona Mine analyzes how the resource condition has changed over time, and is the most useful tool for looking at the accumulated effect of past actions. The analysis also uses regional and local planning documents to refine expectations and project future trends.

The analysis evaluated regional cumulative effects associated with historical (1975 to 2000) and potential future growth (2000 to 2025) in the region. Resource conditions in the year 2000 serve as the baseline conditions for the EIS and are described in Chapter 3.0 - Affected Environment. Future conditions of each resource analyzed were compared to baseline conditions to characterize the environmental consequences of the alternatives evaluated in the EIS.

Several analytical techniques were employed including, GIS analysis, land use/cover mapping, analysis of historical data, and a variety of qualitative analyses. For most resources, the first part of the analysis consisted of mapping land use/cover changes for 1975, 2000, and 2025 within the Peace River basin. These maps and data sets were created by ECT. ECT has created Meta files describing the sources and processes used to create the maps. The three reference years were selected for the following reasons: 1) 1975 was selected because this was the base year for the USEPA Areawide EIS, which means that the base map used to prepare this coverage is the same USGS map that was the base map for the Areawide EIS and one of the first such land use maps of southwest Florida, and because the most accurate map of the cumulative extent of mining in the 1970s is the non-mandatory land reclamation digital coverage developed by the FDEP based upon extensive mapping and field efforts by Zellars-Williams in the late 1970s; 2) 2000 was selected because this was the most recent year for which a basin-wide land use and vegetative cover map was available from the SWFWMD; and 3) 2025 was selected because this is the time period when future land uses have been projected by the host counties.

It is recognized that these three reference years do not coincide perfectly with the years when specific maps used to build this coverage were prepared. Nevertheless, the differences in terms of land uses and vegetative cover were deemed inconsequential. The data sets used to develop these maps were compared for various land cover types and land use changes. The findings were then compared to identify important, and potentially significant, changes between the three time points.

4.26.3 Affected Resources

4.26.3.1 Biological Resources

The present unmined Florida landscape within the phosphate mining region is fragmented by a variety of human activities, with agricultural uses being dominant (Erwin et al., 1997).

DRAFT

Cumulative impacts to vegetation, wildlife resources, and threatened and endangered species resulting from regional development include habitat loss, displacement of fish and wildlife, and reduction in listed species populations. Historical basin-wide data for fish and wildlife resources are not available, however, since the presence of wildlife and protected species is dependent upon the availability of suitable habitat, a qualitative analysis of cumulative impacts to wildlife may be conducted based upon historical, current, and predicted land cover data. To analyze the cumulative impacts of phosphate mining on biological resources in the Peace River basin, vegetative land use/cover data from 1975, 2000, and projections for 2025 were used to identify those habitat types that have changed substantially or are predicted to change within the basin. Site-specific studies of wildlife usage of reclaimed lands also provide valuable information on impacts to listed species of plants and animals.

4.26.3.1.1 Vegetation

Peace River basin land cover/land use data representing conditions in 1975, 2000, and 2025 classified utilizing the FLUCFCS (FDOT, 1999) are presented in Tables 4.26-1, 4.26-2, and 4.26-3, respectively. General trends between 1975 and 2000 include increases in urban and agricultural lands with a corresponding reduction in rangeland, upland forests, and wetlands. Land use is described by acreage as well as expressed as a percentage of the entire 1,502,300-acre basin.

A. Uplands

Upland habitats are not afforded the same level of state and federal protection as wetlands. Consequently, they have been drastically reduced in acreage through conversion to agriculture, urbanization, and mining. An estimated 35 percent of the historical acreage of uplands in central Florida had been lost by 1981 (Christman, 1988). Within the Peace River basin, changes in upland acreage between 1975 and 2000, and predicted land use by 2025 are discussed below by FLUCFCS code.

Urban, Residential, Industrial (FLUCFCS 100 series)

Urban and industrial areas, excluding mining, increased in acreage between 1975 and 2000 by 48,002 acres, representing 3.2 percent of the Peace River basin area. The total area occupied by urban and industrial land uses increased from 5.9 percent (88,391 acres) to 9.1 percent (136,393 acres) of the basin-wide landscape. Based on an analysis of the 2025 map and data, future land use is expected to see an estimated increase of 221,143 new acres in urban areas, which when combined with existing urban areas results in a total of 357,535 acres, or 23.8 percent of the entire basin (SWFRPC, 1999). Concurrent with the increase in urban land use is an increase in transportation and utilities (FLUCFCS 800). Transportation and utilities in the Peace River basin occupied 4,400 acres (0.3 percent of the entire basin) in 1975, 42,546 acres (2.8 percent) in 2000, and will occupy an estimated 38,215 acres (2.5 percent) in 2025. The cumulative impact to vegetation, wildlife, and listed species of this urbanization trend is significant, as development of urban areas is a permanent alteration and displacement of wildlife that typically requires no mitigation for the loss of uplands.

Mining (FLUCFCS 160)

Acreage of mining between 1975 (78,100 acres, 5.2 percent of basin) and 2000 (73,909 acres, 4.9 percent of basin) has remained essentially unchanged. Future land use estimates include a reduction in mining to 33,266 acres, representing 2.2 percent of the Peace River basin. The overall reduction between 1975 and 2025 is 44,835 acres, or 3 percent of the entire basin. Unlike urban and agricultural land uses, upon completion of mining much of the affected lands are reclaimed for future use as natural areas, thereby helping to offset the basin-wide loss of habitat to urbanization. The design of phosphate mine reclamation is focused on the landscape as a series of interconnected natural habitats, which improves upon the pre-mining patchwork distribution of natural areas fragmented by agricultural uses. Improvement in reclamation techniques, coupled with superior water use efficiency and the perimeter ditch and berm system to maintain wetland hydroperiod, reduces the cumulative impact of mining on vegetation, wildlife, and threatened and endangered species.

Agriculture (FLUCFCS 200 series)

Analysis of agricultural land use includes crop and pastureland (FLUCFCS 210), as well as tree crops (FLUCFCS 220), which are primarily citrus. Pastures are the dominant land use within the Peace River basin, occupying 355,156 acres (23.6 percent of the entire basin) in 1975, 448,603 acres (29.9 percent) in 2000, and an estimated 392,015 acres (26.1 percent) in 2025. Tree crops occupied 194,649 acres (13 percent) in 1975, 208,425 acres in 2000 (13.9 percent), and are estimated to cover 138,937 acres (9.2 percent) in 2025. Clearing of upland forests and rangeland for agricultural use is the primary cause of habitat fragmentation in central Florida.

The cumulative effect of agricultural uses is a permanent reduction of habitat and loss of wildlife corridors interconnecting natural areas. Reclamation of agricultural areas is not a regulatory requirement, therefore the habitat loss to agriculture may be considered permanent. The conversion of natural lands to agriculture may be reduced through the utilization of reclaimed phosphate land as pasture. The development of additional mining areas would result in the creation of additional clay settling areas. Because reclaimed settling areas possess superior agronomic soil properties, the post-reclamation use of these areas offers important regional, cumulative ecological benefits by reducing the acreage of lands converted from natural habitat to support agricultural operations, by buffering agricultural lands from other land uses, and by creating physical limitations to the conversion of agricultural lands to urban areas (IMC, 2002). FIPR funded research has proven that the clay soils also offer the opportunity to expand the region's agricultural base to include different high value crops, without requiring the clearing of additional natural areas (FIPR, 1996).

Rangeland (FLUCFCS 300)

Between 1975 and 2000, rangeland including herbaceous, shrub, and palmetto prairie habitats, has been impacted more than any other vegetative community in the Peace River basin. There were 280,707 acres of rangeland in 1975 (18.7 percent of entire basin), 116,429 acres (7.8 percent) in 2000, and an estimated 97,188 acres (6.5 percent) in 2025. This represents an overall loss of approximately 65 percent between 1975 and 2025, primarily due to the increase in urban, industrial, and agricultural uses. The cumulative effect of this dramatic loss of rangelands includes loss of vegetative communities, reduction in wildlife habitat, and potential loss of listed species of flora and fauna.

Upland Forest (FLUCFCS 400)

Coniferous pine forests (FLUCFCS 410) and hardwood-conifer mixed forests (FLUCFCS 434) are dominant in the Peace River basin. Overall, upland forests occupied 173,042 acres (11.5 percent of entire basin) in 1975, 147,751 acres (9.8 percent) in 2000, and will occupy an estimated 130,198 acres (8.7 percent) in 2025. Between 1975 and 2025, an estimated 25 percent of upland forests within the basin will be lost, removing potential wildlife habitat, fragmenting the remaining landscape, and extirpating local populations of state and federal listed species. Upland forest reclamation is not a regulatory requirement for urban developments, therefore the loss of forestland to urban and industrial uses may be considered permanent, whereas reclamation of phosphate mined lands include a substantial amount of upland forest acreage designed to fit within the landscape to connect natural areas and form buffers adjacent to wetland areas.

B. Wetlands

Most wetland habitats are protected by federal and state regulations, which require mitigation of unavoidable impacts. Therefore, it is expected that the reduction in wetland acreage between 1975 and 2025 will not be as significant as the loss of upland habitats, and therefore will not result in extensive cumulative impacts due to loss of habitat as long as the current regulatory conditions persist. Within the Peace River basin, changes in wetland acreage between 1975 and 2000, and predicted land use change by 2025 are discussed below by FLUCFCS code.

Water (FLUCFCS 500)

Streams, lakes, and reservoirs are included within the FLUCFCS 500 series. These areas occupied 50,053 acres (3.3 percent of entire basin) in 1975, 62,255 acres (4.1 percent) in 2000, and will occupy an estimated 57,669 acres (3.8 percent) in 2025. The overall increase of open water habitat between 1975 and 2025 is estimated at 7,616 acres, or a 15 percent of the acreage present in 1975. This increase in open water may be attributed in part to the creation of lakes during phosphate mine reclamation, providing cumulative ecological and recreational benefits to the Peace River basin.

Forested Wetlands (FLUCFCS 610-630)

Forested wetlands occupied 158,999 acres (10.6 percent of entire basin) in 1975, 131,631 acres (8.8 percent) in 2000, and will occupy an estimated 131,272 acres (8.7 percent) in 2025. Due to the requirements of wetland mitigation to offset impacts, essentially no net loss of forested wetlands is expected to occur between 2000 and 2025. Although no longer regulated under USACE jurisdiction, isolated forested wetlands are still regulated by the state, and impacts will require mitigation. Cumulative impacts, therefore, arise from the fragmentation of forested wetlands within the basin-wide landscape, rather than the overall loss of acreage. Recognizing the importance of integrated habitat networks, regulatory agencies are placing emphasis on the placement of reclaimed and created forested wetlands in relationship to other upland and herbaceous wetland habitats. As this trend continues, it is expected that the cumulative effects of habitat fragmentation may be ameliorated. Furthermore, as the science of reclamation advances, the functional values of created forested wetlands will more closely mirror those of natural forested wetlands, improving the wildlife habitat and potential for listed species to use those habitats.

Non-forested Wetlands (FLUCFCS 640-650)

As with forested wetlands, herbaceous wetlands require a permit to fill or dredge, and any unavoidable impacts must be mitigated according to federal and state regulations. Non-forested wetlands occupied 116,730 acres (7.8 percent of entire basin) in 1975, 106,323 acres (7.1 percent) in 2000, and will occupy an estimated 109,495 acres (7.3 percent) in 2025. Cumulative effects of wetland loss are significantly reduced due to the requirement for mitigation, although habitat fragmentation and upland buffer issues may cause adverse effects to vegetation, wildlife, and protected species. As with forested wetlands, the importance of contiguous parcels of natural areas plays a significant role in landscape-wide habitat creation, and future refinement of reclamation will undoubtedly result in the improved ability to recreate the functional values of natural wetlands. The continued advancements in reclamation techniques coupled with the regulatory protection afforded herbaceous wetlands will lessen the cumulative impacts of wetland disturbance to vegetation, wildlife, and listed flora and fauna.

4.26.3.1.2 Wildlife Resources

Cumulative effects to wildlife resources, including threatened and endangered species of flora and fauna, resulting from phosphate mining in the Peace River basin have been greatly ameliorated through successful reclamation and relocation efforts. The displacement of wildlife is a temporary impact, as land reclamation has continued at a pace greater than the rate of newly mined lands. Evidence of wildlife utilization of reclaimed lands indicates that the cumulative effect of phosphate mining has not resulted in the loss of local populations of wildlife. Typically, the pre-mining landscape is dominated by agricultural uses, with fragmented parcels of natural habitat. Reclamation plans are now designed to connect natural areas into contiguous parcels or corridors that allow unimpeded wildlife movement and access to a variety of habitats. The goal is the creation of a landscape that mirrors what historically was present before the large-scale conversion of natural lands to agriculture.

A significant portion of the ecosystem management team permitting effort has focused on planning development of the Ona Mine such that the "areas of conservation interest" and the post-reclamation vegetative cover and land uses fit the regional Integrated Habitat Network (IHN) model developed by FDEP and the FFWCC's "Closing the Gaps" Strategic Habitat Plan. The Ona and Pine Level Mines are likely to be similarly developed, as are other lands adjacent to existing mines. This means that, based upon reasonable assumptions, about 4,000 acres annually would be reclaimed in the future with the specific goal of constructing wildlife habitat in the core corridor areas such that much of the regional model would be implemented by approximately 2030. Consequently, the cumulative impact of mining on vegetation and wildlife resources would be the temporary use of land at a relatively constant rate, which is then mitigated consistent with habitat and wildlife management plans and IHN-based reclamation plans. This results in the gradual construction of significant upland and wetland habitat in logical, contiguous corridors (IMC, 2002).

Wildlife utilization of reclaimed phosphate land is well documented. Studies analyzing bird life associated with wetlands in phosphate mining areas confirm the high avian biodiversity of these reclaimed wetland sites (Kale, 1992; Edelson and Collopy, 1990). In addition, there is evidence that gopher tortoises are successfully re-establishing themselves on phosphate-mined relocation sites (Small and Macdonald, 2001). In a study of the reproduction and growth rates of gopher tortoises relocated to reclaimed lands, no effects on growth rates were observed, and reproductive rates (meaning clutch size) were greater on a phosphate mined site when compared to an unmined pasture site (Small and Macdonald, 2001). An earlier study indicated that reclaimed phosphate mined lands can provide adequate gopher tortoise habitat if sites are prepared to provide sandy soils with sufficient clay or organic content, patches of open ground or sparse vegetation, and a diversity of plant species (Macdonald, 1996). These characteristics are incorporated into the reclamation process to create conditions that are conducive to successful gopher tortoise reintroduction. Similar species-specific habitat needs are incorporated into the design of reclaimed lands to improve the ability of created habitats to support wildlife and reduce the cumulative impacts of mining. Mushinsky and McCoy (1996) studied the distribution of focal species, defined as those species that were found at unmined sites but were missing or under-represented at mined sites. They concluded that at unmined sites, the presence of focal species is strongly associated with the presence of woody groundcover, which, in turn, is strongly associated with a relatively high density of pine trees and a relatively extensive mid-canopy layer. At mined sites, focal species were similarly associated with the presence of woody ground cover. While Mushinsky and McCoy successfully demonstrated the difference in the distribution of small vertebrates between mined and unmined land, the study was conducted on reclaimed lands that were not designed with habitat connectivity as a primary focus. Current methods of reclamation design incorporate a regional landscape approach, which stresses the creation of contiguous parcels of reclaimed habitat that connect with existing undisturbed natural areas. This Integrated Habitat Network design allows for the migration of wildlife over mined and unmined lands, which may allow for colonization of reclaimed lands by the focal species studied by Mushinsky and McCoy.

Comparison with 1978 Areawide EIS

In the Areawide EIS, USEPA projected impacts by watershed based upon several mine development scenarios that would result from the federal action of issuing or denying "new source" NPDES permits (USEPA, 1978). In making these projections, the authors chose 1985 as the year for examining short-term impacts and 2000 as the year for assessing long-term impacts. Given that the year 2000 has just ended, it is useful to compare the Areawide EIS's projections with the actual pace of mining and reclamation that has occurred.

The Areawide EIS did not attempt to project the industry's technological advances that help reduce the impacts of mining (USEPA, 1978). There have been numerous changes in mining, beneficiation, chemical processing, and reclamation techniques implemented since 1978 that lessen the impacts from those described in the Areawide EIS. Principal among these are:

- Improved beneficiation technology that has increased the percentage of phosphate rock recovered from each acre mined and correspondingly reduced the phosphate left in sand tailings and clay settling areas;
- Increased water reuse technology that has reduced the amount of groundwater required to produce one ton of phosphate rock from 1,500 gallons per ton in 1978 to less than 650 gallons per ton in 2000;
- Development of the perimeter berm and recharge ditch system that precludes offsite releases of turbid mine water and reduces the secondary water table drawdown impacts;

- Development of the stage-filling clay settling area management procedure along with the low ground pressure equipment capable of advancing the dewatering of the clay surface;
- Integration of wildlife management into mine planning and reclamation efforts, and;
- Development of improved reclamation technology for herbaceous and forested wetlands, xeric uplands, and pine flatwoods communities.

The FHLP/Cargill Hardee County Mine and the IMC Ona and Pine Level Mines lie principally or entirely within the Peace River basin. Therefore, the analysis conducted relative to the following discussion was limited to the basin rather than the seven county Areawide EIS study area. The Areawide EIS assessed impacts based on predicted rates of mining, reclamation, and water use between 1977 and 2000 (USEPA, 1978). Comparison of these estimated values for the Peace River basin with the actual acreage of mined and reclaimed land reveals that the total acreage of mined lands is less than predicted, and the rate of land reclamation has exceeded the rate of mining (Table 4.26-4). The number of acres reclaimed between 1977 and 2000 (90,935 acres) is greater than the total acreage mined (81,400 acres). Regulatory requirements and technological advances in the field of land reclamation have resulted in the creation of habitat types that previously were not considered reclaimable. For example, the Areawide EIS predicted no reclaimed wetland acreage, although IMC alone reclaimed over 6,800 acres of wetlands between 1977 and 2000 (Smith, 2002). Water use has also been dramatically reduced from the estimates used to determine impacts in the Areawide EIS.

4.26.3.1.3 Biological Resources Summary

The cumulative impacts from the proposed mining at Ona and elsewhere, using existing and reasonably predictable new reclamation technology, has been assessed by several levels of government and found to not be adverse, provided specific protective measures are employed (IMC, 2002).

General land use/cover trends in the study area include increases in urban and agricultural lands with a corresponding reduction in rangeland, upland forests, and wetlands. Because upland habitats are not afforded the same level of state and federal protection as wetlands, they have been drastically reduced in acreage through conversion to agriculture, urbanization, and mining. In the short-term, the combined effect of this land conversion is significant. However, unlike urban and agricultural land uses, upon completion of mining the affected lands are reclaimed for future use as natural areas, thereby helping to offset the basin-wide loss of habitat to urbanization. Reclamation plans are designed to integrate the reclaimed lands into the surrounding natural habitats to create corridors. This improves upon the pre-mining patchwork of natural areas fragmented by agricultural uses. Therefore, the long-term impact of mining, through reclamation, can have a beneficial impact on natural ecosystems and provides improved habitat. Technological

DRAFT

advancements will continue to improve the science of land reclamation, further minimizing the cumulative effect of mining on biological resources.

4.26.3.2 Water Resources

Water resources may be affected by mining in the region in several ways. Surface water quantity can be affected by cumulative rainfall runoff capture from each mining operation. Typically, the larger the area of capture the greater the potential effect. After reclamation, the changes to the drainage basin characteristics, e.g. soils, topography, ET, etc. can affect the resulting streamflows. Surface water quality can be affected during mining from NPDES discharges, from turbid runoff from land clearing, or from a dam break. After mining, changes in drainage basin characteristics, e.g. soils and land use, can affect water quality regionally.

Groundwater resources can also be affected during mining. Pumping to provide water to beneficiation plants can have a cumulative effect. Dewatering of the surficial aquifer can also affect the groundwater in an area. Likewise, the surficial aquifer water quality can be affected by seepage from mine cuts, recirculation ditches, and settling areas. The FAS water quality may be affected from the cumulative effect of pumping to meet the various water demands of the mines, which can cause saltwater intrusion and upconing from deeper aquifers.

4.26.3.2.1 Surface Water Quantity

To evaluate surface water cumulative effect/impact on water quantity and quality, the overall Peace River basin was reviewed for overall trends. A regional description, which includes a figure showing the location of the Ona site within the basin, is provided in Section 3.5.1 (Figure 3.5-1). Because of the influences of other man-made activities within the overall basin, detailed evaluations focused on several major tributaries of the Peace River located in or near the Ona mining area with varying levels of mining activities, namely, Payne Creek, Horse Creek and Joshua Creek. These evaluations allowed impacts from mining to be compared to other types of impacts. In addition to impacts associated with the Ona Mine, impacts from other major activities within these tributaries of the Peace River basin were considered to evaluate the overall impact on water quality and quantity. Information on the NPDES outfalls and water extraction from the river within these basins were considered. For the cumulative effect analysis, water quality parameters associated primarily with the activities from phosphate mining were discussed.

The Areawide EIS evaluated the potential impacts to surface water quantity that would result from its ultimately-adopted recommendation to contain rainfall runoff onsite to reduce demands on the FAS (USEPA, 1978). On page 2.89 of Volume II, the Areawide EIS states:

DRAFT

"This scenario evaluating the mining and beneficiation operations utilizing recirculated water assumes that makeup water will be pumped from the Floridan aquifer. The only source of water for the containments will be rainfall on the areas being mined. This, then, is a surface-water problem, although it indirectly reflects on the groundwater system of the Floridan and water-table aquifers. In many instances, current pumpage from the Floridan aquifer for mining purposes can be considered an augmentation of surface-water flows. Prime examples of such augmentation are the Alafia and Peace rivers. Although there has been neither a clear-cut definition of the groundwater contribution to those river systems nor quantification of the contribution, the phenomenon has been observed.

As mentioned previously, the conditions of this scenario will be very beneficial to the Floridan aquifer in that the reduction in pumpage will raise its potentiometric surface. At the same time, however, the reduction in pumpage can be considered to be a reduction in overall water input to the water-table aquifer; as less water reaches the water-table aquifer, less water will emerge as surface-water runoff. Thus, this scenario will affect flows of rivers presently draining mining areas – primarily the Alafia, Little Manatee, Manatee, and Peace. If surface-water flows in those areas are reduced, the effects will certainly be felt by aquatic flora and fauna that depend on the flows" (USEPA, 1978)

Further, the Areawide EIS estimated the reductions in the flow of the Peace River that would be caused by these USEPA-recommended permit conditions to be included in any NPDES permit issued after 1976. On page 3.32 of Volume I, the Areawide EIS states:

"It has been projected that discharge decreases attributable to evaporation losses of impounded water in the Peace River Basin will be a equivalent to about 15 cubic feet per second by 1985 and 21 cubic feet per second by 2000 in the Peace River…" (USEPA, 1978)

Actual flow data examined in IMC's supplemental hydrologic analyses as part of the CDA process demonstrate that this reduction did not occur. This was primarily because mining reclamation established drainage patterns that were similar to pre-mining conditions and the reclamation of lands mined prior to 1975 under Florida's "Old Lands" reclamation program (IMC, 2002).

In addition, the USGS and SWFWMD have independently investigated if the flow in the Peace River has been reduced. In an April 1988 report entitled: *Ground-Water Resource Availability Inventory: Polk County, Florida,* the SWFWMD states:

> *"Over the past twenty-five years (since 1961), a general reduction in the average annual rainfall has occurred in a band extending from Tampa on the west, to Orlando in east-central Florida. … This broad band includes most of Polk County. In this area, average annual rainfall has been reduced by 10 to 16 percent, which has resulted in an estimated reduction of the usable water resource (precipitation minus evapotranspiration) of 30 to 40 percent. … It was found that 1961 marked the beginning of a distinct change in the rainfall patterns. Comparisons of monthly and annual averages for the period 1961-1985 against those for 1901-1960 showed that out of fourteen stations analyzed, thirteen had rainfall deficits…"* (SWFWMD, 1988b).

The capture of rainfall runoff from, and direct precipitation onto, lands within active mining areas is considered Best Available Technology by the USEPA (see 40 CFR 136), and is incorporated into IMC's surface water discharge permits as specific conditions. Similar conditions are expected for the surface water discharge permits to be issued by FDEP for the Ona site.

To understand the changes in streamflow attributed to rainfall, anthropogenic factors that could affect streamflow were reviewed, e.g. water use.

A. <u>Water Use</u>

The historical, existing, and future water use demands for the region are presented in this section. Historical water use by county was tabulated as part of the Areawide EIS and is shown in Table 4.26-5. To assess changes in water use demands since the Areawide EIS was prepared, recent water use information was collected and tabulated for the same seven counties studied in the Areawide EIS. This data was tabulated and shown in the SWFWMD publication for 1999 estimated water use (Table 4.26-6) (SWFWMD, 2001a). The table presents the water quantity by type of use for each of the seven counties.

A summary of the estimated change in water use demand from 1975 to 1999 is presented in Table 4.26-7. The summary of the change for the entire seven county area indicates that groundwater and surface water use decreased approximately 26 percent and 51 percent during the time-period, respectively. The largest decrease in groundwater use resulted from the phosphate industry (combining phosphate plants, phosphate mining, and mining/dewatering) with a reduction of over 190 mgd, a 74 percent decrease. Other major reductions included decreases for agriculture and industrial uses of over 170 mgd (28 percent) and 60 mgd (73 percent), respectively. Therefore, based on the water use presented in the Areawide EIS and SWFWMD reports, these three uses accounted for a reduction of over 420 mgd (45 percent) (USEPA, 1978 and SWFWMD, 2001a). However, these reductions have been offset by increases for public supply, domestic supply, and recreational water uses totaling approximately 150 mgd (160 percent). Therefore, the net reduction for the time-period is 26 percent for the seven county area. The majority of this decrease occurred in Polk and Hardee Counties with reductions of 214 mgd and 117 mgd, respectively.

With regard to surface water, the largest decrease from 1975 to 1999 occurred in Polk County with the reduction of 252 mgd of water use from Lake Parker for the City of Lakeland power plant. Since 1975 changes at the plant include other sources of water, e.g. reuse water and groundwater. For the region, the change in surface water use for the 1975 to 1999 time period was a decrease of 190 mgd. However, the change in surface water use during this time-period without the City of Lakeland power plant once-through cooling was an increase of 62 mgd. A review of the changes shows that the only other reduction in surface water use was for phosphate plants, which eliminated the withdrawal of 21 mgd in Hillsborough County. The largest increase in surface water use was for public supply with the addition of over 27 mgd (26 percent). Most of this increase occurred in DeSoto and Hillsborough Counties. The withdrawal in DeSoto County is from the PRMWSA as described in Section 3.5.1.3. Mining/Dewatering surface water use accounted for 17 mgd in 1999, however, since this category was not separately identified in 1975, the relative change could not be calculated.

The SWFWMD Water Supply Plan data was used to assess regional water use demands for the future. Table 4.26-8 shows the projected values for the year 2020. The categories were the same as presented for 1999 except for the combining of Industrial/Commercial, Mining/Dewatering, and Power Generation by the SWFWMD. This combined category includes all phosphate mining and chemical plant water use demands. The results indicate that the largest water user projected for 2020 for the seven county region is agriculture with a use of over 600 mgd (51 percent of the regional total). The second largest user is projected to be public supply with a use of over 370 mgd (31 percent of the regional total). The new category Industrial/Commercial, Mining/Dewatering, and Power Generation, which includes phosphate mining, has a combined projected use of 129 mgd (11 percent of the regional total) of the total.

The projected uses for 2020 were compared to the 1999 use and the estimated change is shown in Table 4.26-9. Agriculture has the largest projected increase of over 150 mgd (35 percent). The second largest increase is for public supply with over 40 mgd (13 percent) additional needs. The new category Industrial/Commercial, Mining/Dewatering, and Power Generation, which includes new mining operations, is projected to increase by almost 20 mgd, which is 17 percent of the current use. In terms of percent increases, the largest increase is projected for domestic self-supply with an increase of over 60 percent, which is almost 15 mgd.

DRAFT

The projected water use for the category containing phosphate mining is relatively low compared to the major users, i.e. agricultural and public supply. The large water use reductions that the phosphate industry has achieved accounts for the majority of this change. In addition, water use for mining in the northern phosphate area will be further reduced by mining operations moving into the southern phosphate area. Since the phosphate chemical plants will remain in the northern phosphate area, the impacts of future water withdrawals for mining will not only be reduced in quantity relative to historical uses, but also will be separated farther from the phosphate chemical plants, which also have water demands. Therefore, the drawdowns from these demands are not expected to cause any significant impacts on the region. This has been demonstrated by the SWFWMD issuance of the WUP for the entire IMC operation.

B. NPDES Discharges

Phosphate mining has been conducted in the Peace River basin by IMC for many decades. The Peace River basin contains point source discharges from a multitude of domestic and industrial discharges. Domestic point sources treat human waste and must dispose of the treated effluent by either discharging it to a receiving stream or by some other method, e.g. providing it as reuse water or by land applications. Industrial point sources discharge process water generated from the operations being conducted at their facilities, e.g. phosphate mines, generate excess water during periods of high rainfall when storage capacity is exceeded. IMC's existing operations have been issued NPDES permits for the discharge of excess water and stormwater. All discharges must satisfy permit limits and cannot result in water quality standard violations.

The Peace River Comprehensive Plan identified 46 major point sources (defined as facilities with permitted discharges exceeding 0.1 mgd of effluent) that discharge to surface waters in the Peace River basin (SWFMWD, 1995). To assess the impacts of discharges from mines on receiving streams, this cumulative impact analysis used detailed information for only selected tributaries to the Peace River that are isolated from other discharges. The tributaries selected included Payne Creek, Horse Creek and Joshua Creek.

Payne Creek receives discharge from several phosphate mines including IMC's Fort Green Mine, which is similar to the proposed operations for the Ona site and NPDES discharge. The northern portion of Horse Creek has been mined since 1978. To estimate the impacts of mining, this northern area was compared to the southern area of the basin where mining has not occurred. Joshua Creek has been included as a comparison for a drainage basin with no mining. Each of these basins is discussed in detail in subsequent sections on water quantity (Section 4.26.3.2.1 Part D. Hydrology) and water quality (4.26.3.2.2 Surface Water Quality).

C. Land Cover

To assess the impacts of changes in land use/cover on the Peace River basin, maps were created for 1975, 2000, and 2025 showing land use/cover including reclaimed phosphate mining areas (Figures 4.26-1, 4.26-2, and 4.26-3, respectively). The tabular data for the 1975, 2000, and 2025 mapping are presented in Tables 4.26-1, 4.26-2, and 4.26-3, respectively.

A comparison of the land use changes are summarized in Table 4.26-10 and are discussed in terms of percent change relative to the entire Peace River basin, e.g. a one percent change represents approximately 15,000 acres of the entire basin. The results indicate that the urban land cover increased by 3.2 percent (48,002 acres) from 1975 to 2000, and occurred primarily in the northern portion of the basin. Other major changes included an 8.8 percent (133,314 acres) increase in agricultural, which includes cropland, pastureland, and citrus groves, and a two percent change in transportation and utilities. The majority of the agricultural increase was in the pasture and cropland category.

Major decreases include a 10.9 percent (164,278 acres) loss of rangeland, and a 2.5 percent (25,262 acres) loss of wetlands. The area of active mining decreased slightly by 0.3 percent (4,191 acres) during the 25 year period, even though approximately 68,000 additional acres had been mined. This is a result of a corresponding number of acres that were reclaimed during this same time-period. Most of the mined land was reclaimed as improved pasture, which accounts for a major portion of the increase in the agricultural category.

D. Hydrology

Regional Analysis

The overall net effect on the surface water hydrology from the these land use changes was analyzed by using data from the USGS surface water station on the Peace River in Arcadia, which is the farthest station downstream. This station has a drainage basin area of 1,367 square miles, and represents approximately 57 percent of the entire Peace River drainage basin. The station has been monitored since 1931 and a long-term annual runoff rate of 10.7 inches has been recorded. Results of an analysis by the SWFWMD (1996) indicated that a downward trend in Peace River flows at Arcadia was 1.32 percent per year since 1970.

Coastal (1996) also conducted an analysis of rainfall since 1970 in the Peace River basin, which indicated a rainfall deficit has occurred. The rainfall deficit was calculated as an estimated annual percent decline, which ranged from 0.41 percent at Bartow in the northern portion of the basin to 0.32 percent at Arcadia in the southern area.

The long-term rainfall for Arcadia, which has been monitored since 1933, is 52.9 inches. Using the calculated rainfall deficit decline of 0.32 percent for Arcadia, the average reduction in rainfall since 1970 is 0.17 inches per year. Using the long-term annual runoff of 10.7 inches and the calculated downward trend decline of 1.32 percent per year, the average annual reduction since 1970 is 0.14 inches per year. While this seems small on an annual basis, the cumulative reduction in rainfall over a 30-year period would be over 75 inches. Correspondingly the cumulative reduction in streamflow expressed in inches of runoff for a 30-year period would be over 60 inches. Using the long-term annual runoff of 10.7 inches, this reduction is the equivalent of over five years of streamflow in the Peace River. In general, the primary influence on the quantity of streamflow is the rainfall. Since changes in the rainfall are greater than the changes in runoff, in general, the majority of the decrease in flow at Arcadia could be attributed to the reduction in rainfall.

Ardaman & Associates recently conducted hydrology study of the effects of phosphate mining and other land uses on Peace River flows. As part of the study, the 30-year moving average of the regional rainfall and runoff in the Peace River Basin was prepared and is presented in Figure 3.5-3. This analysis utilized rainfall data back to 1933. The results are more pronounced than the study by Coastal (1996) in that the 30-year average rainfall decreased 5 inches during the period of study or an equivalent of approximately 150 inches when compared to the previous 30-year period. The figure also shows a corresponding decrease in the 30-year average runoff of nearly five inches. The study concluded that almost the entire decrease in runoff in the Peace River could be explained by the decrease in rainfall (Ardaman, 2002).

SWFWMD (2002) has prepared a draft report of the Upper Peace River on minimum flows and levels that included a review of the findings of Ardaman and Coastal Environmental. This study found that Garlanger attributed 89 per cent of the reduction of flow at Arcadia to the difference between two 30-year periods studied. The study also found similar results from Coastal Environmental, which concluded that 90 percent of the change in streamflow at the Arcadia gauge could be explained by changes in rainfall.

Since a number of land use changes and hydrological changes have taken place in the Peace River basin during the period of monitoring, a more detailed analysis of individual drainage basins has been conducted. The purpose of this analysis was to isolate the changes that may be attributed to mining since such impacts may have been offset by other changes within the overall basin.

Detailed Basin Evaluation

To further understand the effects that mining may have on hydrology, three drainage basins have been evaluated in detail. Criteria used to select the drainage basins included: proximity to the Ona site; drainage basin size; long-term monitoring for streamflow, water quality, and rainfall; location within the Peace River basin; minimal urban land use; extensive mining in one of the basins. The basins that favorably met the criteria were Payne Creek, Horse Creek, and Joshua Creek. Payne Creek was selected because the majority of this basin has been mined and receives NPDES discharges from phosphate mines. Therefore, if there were negative water quality impacts from mining, one would expect them to occur here. Horse Creek is a drainage basin that is primarily in agriculture land use, but has been partially mined and is projected for additional mining. Joshua Creek was chosen as a drainage basin with primarily agriculture land use with no existing or proposed mining. A summary of the 1975, 2000, and 2025 land uses for Payne Creek are presented in Tables 4.26-11, 4.26-12, and 4.26-13, respectively. Likewise, summaries of land uses are presented for Horse Creek and Joshua Creek in Tables 4.26-14 through 4.26-16, and 4.26-17 through 4.26-19, respectively.

To discuss the land use changes for each basin, the results of the comparison was summarized for Payne Creek, Horse Creek and Joshua Creek in Tables 4.26-20 through 4.26-22, respectively. The results are discussed in terms of percent change relative to the entire drainage basin being discussed, e.g. a one percent change in Payne Creek represents approximately 800 acres of the entire basin.

The results of the land use/cover changes for the Payne Creek basin indicate that the mined area increased by 19.0 percent (15,238 acres) from 1975 to 2000, and occurred throughout the basin. Other major changes during this time-period included an 11.2 percent (8,970 acres) increase in cropland and pastureland and a 7.3 percent (5,885 acres) increase in transportation and utilities. The utilities category includes new power plants, which account for the majority of this increase. The increase in mining does not reflect the 29.1 percent (23,305 acres) that have been mined and reclaimed in the Payne Creek basin during this period. Some of the mined land was reclaimed as improved pasture and acreage for power plants, which accounts for a major portion of the increases in cropland and pastureland category and the transportation and utilities category. The major decreases include a 19.8 percent (15,911 acres) loss of rangeland, a 14.0 percent (11,257 acres) loss of forested uplands and a 6.2 percent (4,956 acres) loss of tree crops, which are primarily citrus groves.

The results of the land cover changes for the Horse Creek basin indicate that the pasture and cropland area increased by 8.3 percent (12,972 acres) from 1975 to 2000 (Table 4.26-21). Other major changes during this time-period included a 5.3 percent (8,296 acres) increase in mined area. The increase in mining does not reflect the 0.7 percent (1,122 acres) that have been mined and reclaimed in the Horse Creek basin during this period. The major decreases include a 14.1 percent (22,115 acres) loss of rangeland and a 3.8 percent (6,002 acres) loss of forested wetlands.

The results of the land use/cover changes for the Joshua Creek basin indicate that the tree crop category (primarily citrus groves) increased by 20.8 percent (16,079 acres) from 1975 to 2000 (Table 4.26-22). Other major changes during this time-period included a 2.6 percent (2,048 acres) increase in urban area. The major decreases include a 14.9 percent (11,537 acres) loss of rangeland and an 8.7 percent (6,717 acres) loss of pasture and cropland.

Comparing the three basins, it is important to note that the major increases to land use/cover are to either mining or agriculture, whereas the major decreases are in rangeland. Therefore, the changes from natural areas are occurring with or without mining.

In addition to changes in land use/cover, a review was conducted of the differences in soils for the three drainage basins. Soil characteristics are one of the factors that influence the runoff from a drainage basin. The soils are typically classified alphabetically from A to D according to their hydrologic soil group rating. A value of A represents a well-drained soil while a value of D is a very poorly drained soil. The results of a study conducted for the Charlotte Harbor National Estuary Program (CHNEP, 1999) was used to compare the soils classifications for the three basins analyzed. Table 4.26-23 presents the hydrologic soil groups for the Payne Creek, Horse Creek, and Joshua Creek watersheds. A review of the data indicates that Horse Creek and Joshua Creek are similar in that most of the drainage basin falls into the hydrologic soil group B category, which is moderately drained. However, the Payne Creek basin, when compared to the other two drainage basins, has a larger percentage of soils in the hydrologic group A and hydrologic group D categories. The differences in these two groups are attributed to mining activities in Payne Creek, in that the additional group A soils are likely from the disposal of sand tailings, while the increase of group D soils are the result of clay settling areas.

To compare the hydrology in Payne Creek, Horse Creek and Joshua Creek, the long-term records from USGS gauging stations for each stream were utilized along with long-term rainfall stations. Common monitoring periods in ten-year increments were chosen, when possible, so that results would be directly comparable and demonstrate changes relative to the progression of mining. Since Payne Creek was critical to assessing these changes, the oldest available database was utilized. The USGS maintained two monitoring periods for Payne Creek, from October 1963 through September 1968, and from October 1979 to present.

The first period was analyzed because it represents a period when mining within the drainage basin occupied less than 15 percent (12,000 acres) of the total area based on 1975 land use. Since 1975, mining and reclamation have occurred such that by 2000, over 63 percent (approximately 51,000 acres of 80,000 acres) had been mined. Of this mined area, approximately 50 percent (approximately 25,000 acres) of the mined land had been reclaimed. Clay settling areas have occupied approximately 25 percent

DRAFT

(approximately 20,000 acres) of the drainage basin and 25 percent (approximately 5,000 acres) of the clay settling areas have been reclaimed. As shown in Table 4.26-12, phosphate mining was capturing over 27,000 acres of the Payne Creek watershed in 2000.

For comparison, Figure 4.26-4 shows the area captured by phosphate mining from 1975 through 2025 in the Horse Creek basin. Horse Creek has less than 9,000 acres that were being captured in 2000, and has a maximum projected capture in 2014 of approximately 24,000 acres. While this is less than the 27,000 acres captured in Payne Creek in 2000, it is also considerably less than Payne Creek when expressed as a percentage of the basin, i.e. 15.3 percent maximum for Horse Creek versus 34 percent for Payne Creek in 2000. Therefore, Payne Creek in 2000 represents the worst-case in terms of maximum projected acreage captured in the Horse Creek drainage basin and is more than double that for Horse Creek in terms of the maximum expressed as a percentage of the entire drainage basin.

With regard to the Peace River basin, the area captured by phosphate mining from 1975 through 2025 for this basin is presented in Figure 4.26-5. As shown in the figure, the maximum area of capture occurred in the early 1980's with approximately 75,000 acres of the 1,500,000 acres basin (5.0 percent). Future projections shown indicate that a maximum of approximately 38,000 acres will be captured around the year 2010. However, data shown on Figure 4.26-4 indicates that approximately 24,000 acres of this total will be captured in the Horse Creek basin. Therefore, the projected maximum capture in the Peace River upstream of the Arcadia gauging station is approximately 14,000 acres. This projected acreage is well below capture in Payne Creek in 2000 (27,000 acres) and over 20 times less than Payne Creek when expressed as a percent of the drainage basin (1.6 percent for Peace River versus 34 percent for Payne Creek).

Since the proportion of phosphate mining and reclamation to the size of the Payne Creek drainage basin is much greater than is projected for either Horse Creek or the Peace River basins, the results of the Payne Creek analysis have been used to conservatively represent a worst-case projection for each of these basins. To evaluate the impacts from mining on the Payne Creek surface water hydrology, a rainfall/runoff analysis was performed for each of the same three basins for common time-periods. The results of the analyses are presented in Table 4.26-24. The upper portion of the table expresses the runoff as inches per year, which is the depth of water that would cover the drainage area if all the runoff for the year were uniformly distributed over it. For each basin and time-period, the rainfall for that drainage basin has also been included as inches per year. The results indicate that during all monitoring periods, Payne Creek had higher runoff than Joshua Creek, and had higher runoff than Horse Creek during two of the three periods monitored.

In an adjacent column in the table, the runoff is expressed as a percentage of the rainfall to normalize differences in rainfall between the basins. The result of this analysis shows that Payne Creek had the highest runoff rates for each time-period monitored, even during the period that ended with Payne Creek having over 30 percent of its watershed captured by mining and approximately 30 percent of the basin that had been reclaimed. A comparison of Joshua Creek and Horse Creek indicates that except for the 1963 to 1968 time-period, the two basins had no significant difference in runoff rates even though the potential impacts from mining during the period (as demonstrated in Figure 4.26-4) have progressively increased in the Horse Creek basin. In conclusion, the evaluation of the three basins did not indicate any significant differences between runoff rates from extensively mined drainage basins and those with no mining.

The site-specific analyses performed in Section 4.5.1 to predict changes in runoff demonstrate that any changes in flow at the downstream property boundaries, on either a specific storm event or annual average basis, would be very small and fall well within the ranges of hydrologic cycles experienced in Florida. More importantly, because mining of the Ona site simply represents a shift in the location of mining rather than a net increase in the lands to be used by mining operations, a net measurable effect on the downstream reaches of the Peace River is not expected. This is the only location within the region, or the watershed, where surface water is relied upon for water supply.

4.26.3.2.2 Surface Water Quality

The Areawide EIS evaluated the water quality of the region in the 1970's time frame and summarized the problems as:

> "*The study area's major surface water quality problems are high concentrations of nutrients (nitrogen and phosphorus); low dissolved oxygen and pH; high color; and high suspended solids and organic and fluoride concentrations."* (USEPA, 1978).

As projected in the Areawide EIS, phosphate mining is progressing to the south as the northern reserves are depleted. The Ona site, which is part of this southern progression, is in Hardee County and is drained primarily by Horse Creek and tributaries of the Peace River as shown in Figure 3.5-1. The water quality within the drainage basin near the Ona site and a site-specific description are included in Section 3.6 of this EIS. Horse Creek is a tributary of the Peace River, which is used for municipal water supply by the PRMWSA downstream of their confluence. The Peace River empties into Charlotte Harbor, which is part of the National Estuary Program. The Florida Outstanding Waters in the Peace River basin and Charlotte Harbor, which are defined as waters designated by the Environmental Regulation Commission as worthy of special protection, are shown on Figure 3.6-1.

DRAFT

The following section presents a brief discussion of the water quality in the Peace River basin. To assess impacts in greater detail, the general discussion is followed by a detailed evaluation of three drainage basins that range in land cover from having extensive phosphate mining to having no mining. For the general discussion, water quality has been tabulated by river segments that were established in the Areawide EIS. The river segments were assigned designations for the Peace River and its major tributaries with a "P" prefix; Horse Creek with an "HC" prefix; Prairie Creek with an "S" prefix; and Charlotte Harbor with a "CH" prefix. The Areawide EIS evaluated the water quality based on these designated segments for each stream. At each segment the Areawide EIS used a multitude of sampling stations to avoid discontinuous databases. The characterization of the water quality in the Areawide EIS relied on STORET, a computerized database of water quality.

The characterization of current water quality and associated trends are based on the same stream segments and sampling stations as was used in the Areawide EIS. STORET water quality parameters were used to compile an updated database. Figure 4.26-6 shows river segments in the Peace River basin that correspond to the tabulated data. Table 4.26-25 provides a description of the stream segments. A summary of the water quality data for each river segment for three periods (1970 through 1976, 1980 through 1989, and 1990 through 1999) are presented in Table 4.26-26a. These periods were chosen to assess if over the past three decades the water quality in the Peace River basin was improving or degrading for parameters associated with phosphate mining.

There are seven river segments from upstream to downstream that are used to represent water quality data for the Peace River. In addition, there is long-term monitoring data at the exit of Payne Creek to the Peace River to compare a stream with a high component of mine discharge to general river water quality. The time-period discussed below, unless otherwise noted, refers to the period from 1970 to 2000, which is summarized in Table 4.26-26a and Table 4.26-26b. The segments are from upstream to downstream along the main channel of the Peace River. From the 1970's to the 1990's, the average concentration in the upstream segments (P.3 and P.4) indicates that color increased during both decades. The average values for color during the time-period were moderately high when compared to Florida streams. During the same time-period significant decreases occurred for fluoride, ortho-phosphate, and total phosphorus while conductivity had moderate decreases. Average concentrations in the Peace River (P.7) upstream of Payne Creek indicated increases in conductivity and turbidity over the time-period. However, downstream of Payne Creek these parameters were decreasing over the period, along with lower average values for ammonia and total phosphorus. The Peace River segment (P.13) upstream of Joshua Creek had increasing average concentrations for DO and decreasing concentrations for TKN, TP, color and turbidity. The average concentrations downstream (P.14) of Joshua Creek increased for DO, but decreased for color, TKN, turbidity and pH over the period.

Similar databases have been used for regional studies to assess impacts as part of the Charlotte Harbor National Estuary Program. In a recent evaluation of longterm data over the past three decades, a trend analysis was conducted as part of a regional study. For these analyses, the Peace River was divided into larger segments than are provided in Table 4.26-26a and Table 4.26-26b and included data for stations not included in the Areawide EIS. Therefore, the results of the trend analysis, presented in Table 4.26-27, are based on different sampling bases and longer stream segments than the water quality data summaries in Table 4.26-25.

The segments of the Peace River basin in Table 4.26-26a and Table 4.26-26b that may have been influenced by phosphate mining are the Peace River at Arcadia, the lower Peace River, and Horse Creek again compared to incoming water from the exit of Payne Creek. The results indicated that these three segments during the analysis period had an increasing trend for turbidity, and decreasing trends for ortho-phosphate and total phosphorus. In addition, the lower Peace River and Horse Creek segments both had an increasing trend for nitrate-nitrite nitrogen, which is attributed to agricultural activities. The lower Peace River showed a decreasing trend for TKN. The only basin that showed an increasing trend for chlorophyll-a was Horse Creek.

To assess the effect of mining on the water quality parameters showing increasing trends, the results of the analyses were compared to monitoring conducted since 1976 by IMC and the previous owner in Payne Creek at the exit from the Fort Green Mine. The monitoring program is conducted in the upstream portion of Payne Creek and has varied over time with the number of parameters generally increasing. The water quality data is summarized for the period in Table 4.26-28.

As shown in the land use/cover in Table 4.26-20, during this period mining has progressed within the Payne Creek basin. The Fort Green Mine was active through that period of mining and represents thousands of acres mined, and reclaimed. Mining has included the construction and utilization of clay settling areas upstream of the monitoring. In addition, NPDES data indicate that billions of gallons of water were discharged through permitted outfalls into Payne Creek.

Therefore, the results of the Payne Creek outlet monitoring represent the expected water quality in a stream highly influenced by a phosphate mining operation similar to mining in the region conducted in the past or proposed in the future. A long-term trend analysis was conducted on the data and is presented in Table 4.26-29. The results of the analysis indicate that the only significant changes in water quality over the time-period were increases in DO and alkalinity, and decreases in fluoride. Therefore, based on the results of the trend analysis for the Payne Creek data, the increases in the Peace River basin in turbidity, nitrate or nitrite appear to have been from a source other than phosphate mining.

To study changes that may have occurred in the Horse Creek basin from mining, water quality data influenced by the mined areas of the basin were reviewed. Water quality monitoring has been ongoing since 1988 at the exit from the Fort Green Mine, which is located in the upstream portion of the Horse Creek. The results of the water quality monitoring are summarized in Table 4.26-30. Activities related to the phosphate industry in the watershed during the period were limited to mining, reclamation, and the construction of a clay settling area, The mining NPDES outfalls were constructed in 1999 and 2001, but have not been used because of drought conditions. Therefore, the water quality data was not influenced by NPDES discharges. A long-term analysis was conducted on the data and is presented in Table 4.26-31. The results of the analysis indicated that during the represented period, the only significant upward trends were seen in color, alkalinity, and total organic carbon, whereas, chlorophyll-a showed a significant downward trend. Therefore, based on the results of the trend analysis for the Horse Creek data, the increases in turbidity in Horse Creek were probably from a source other than phosphate mining.

Since the analyses for the Peace River basin typically covered a broad area of impacts from multiple sources, a review of the changes in the conditions of selected streams was conducted to help isolate the potential impacts from phosphate mining on tributaries of the Peace River. For this review, the three basins studied in detail for the hydrology assessment were again relied upon to assess the cumulative effects on surface water quality.

To compare the water quality in Payne Creek, Horse Creek and Joshua Creek, the land use information and long-term water quality data were used. A comparison of the land use changes in each of these basins is summarized in Tables 4.26-20 through Tables 4.26-22, respectively. A description of these land use changes is included in Section 4.26.3.2.1D, Hydrology. In addition, because of mining in the upstream area of Horse Creek, data for the northern and southern portions of the creek have been summarized in Tables 4.26-32 and 4.26-33, respectively. The results are discussed in terms of percent change relative to the entire drainage basin being discussed, e.g. a one percent change in Horse Creek northern area represents approximately 260 acres of the entire basin.

The results of the land cover changes for the Horse Creek northern basin indicate that the mined area increased by 26.7 percent (6,994 acres) from 1975 to 2000, and occurred in the headwater areas (Table 4.26-32). The increase in mining does not reflect the 4.3 percent (1,122 acres) that have been mined and reclaimed in the basin during this period. The major decreases include a 24.7 percent change (6,467 acres) of rangeland, and a 3.3 percent change (875 acres) of cropland and pasture land.

The results of the land cover changes for the Horse Creek southern basin indicate that the pasture and cropland area increased by 11.4 percent (12,867 acres) from 1975 to 2000 (Table 4.26-33). A small increase during this time-period included a 1.2 percent change (1,301 acres) in mined area, which is the total mined area in the southern basin. The major decreases include a 12.9 percent change (14,494 acres) of rangeland and a 3.8 percent change (4,290 acres) of forested wetlands.

The results of the land cover changes for the Joshua Creek basin indicate that the tree crop area (primarily citrus groves) increased by 20.8 percent (16,079 acres) from 1975 to 2000 (Table 4.26-22). Other major increases during this time-period included a 2.6 percent change (2,048 acres) in urban area. The major decreases include a 14.9 percent change (11,537 acres) of rangeland and an 8.7 percent change (6,717 acres) of pasture and cropland.

As discussed in the hydrology section, a comparison of the three basins indicates that the major increases to land cover are to either mining or agriculture, whereas the major decreases are to rangeland. Therefore, the changes from natural areas are occurring with or without mining. The analyses of surface water quantity from these land cover changes indicated that over the past three decades, no significant differences to the hydrology had occurred between these three basins.

A summary of the water quality data collected for the past three decades is presented in Table 4.26-26b for selected stream segments in the Peace River basin. The stream segments that correspond to Payne Creek and Joshua Creek are designated P.8 and P.13 in the table, respectively. The stream segments that correspond to Horse Creek are designated HC.1 through HC.4 in the table. HC.1 starts at the upstream segment of Horse Creek, whereas HC.4 corresponds to the downstream segment. A description of each segment is included in Table 4.26-25.

The summary indicates that the stations selected to develop this database were not consistently sampled in the three basins to perform a detailed review. Therefore, this data was augmented with more intensive monitoring information to assess the changes due to mining. The information from the DEP 305b study, which is used to report the conditions and trends on the Florida streams, was used for the detailed information needed. The 305b study includes the use of a water quality index, which FDEP has developed to assess water quality in streams. The index values for each stream are calculated from various water quality categories. The values are indexed by FDEP into good, fair, and poor water quality rankings for comparative purposes. FDEP also assigns a confidence level to each calculation depending on the available data to perform the calculation. For this discussion, only calculations identified by FDEP as having a medium to high confidence level were included, since values identified as low by FDEP were considered unreliable.

Because of limited data for the downstream portion of Payne Creek, only the 1995 time-period, which was ranked “fair”, was identified with a medium confidence level by FDEP. The other time periods were identified with a low confidence level and therefore not included in this discussion. Since this downstream segment receives influence from land uses that are not prevalent in an upstream subbasin (which is predominately mining), the upstream subbasin, namely the Little Payne Creek basin, was also reviewed. Over 75 percent of the Little Payne Creek subbasin has been mined, and in 2000 mining occupied 47 percent of the subbasin. This represents a higher level of mining than the lower portion of Payne Creek, which in 2000 was 27 percent mining and had approximately 48 percent of the subbasin that had been mined. For Little Payne Creek, both 1990 and 1995 were ranked in the FDEP analyses as “good”. Other than the difference in mining influence, the primary difference between the land cover between these two basins is that lower Payne Creek has over 5000 acres (12 percent) in tree crops, whereas less than one percent of Little Payne Creek is covered by tree crops. The results indicate that the subbasin highly influenced by mining was ranked “good” while the subbasin influenced by mining and tree crops was ranked “fair”. To further evaluate this difference in rankings relative to mining, the Horse Creek basin was also studied.

For a comparable evaluation of the Horse Creek basin, several segments categorized by FDEP were selected. The upstream and downstream portions of Horse Creek were reviewed for historical FDEP rankings. The north portion where the mining has progressed since 1978 has been ranked “good” for all five time-periods with sufficient data. This included the period from 1970 to 1995. A comparison with the lower portion of Horse Creek indicates that this stream segment was ranked “fair” in 1970, “good” in 1975 and 1980, but was back to a ranking of “fair” for the three analysis periods 1985, 1990, and 1995. Therefore, the influences of mining in the northern area of the stream, which accounted for over 25 percent of the area in 2000, have not caused changes in the stream ranking during the progression of mining. Whereas, the rankings in the downstream portion of Horse Creek with influences primarily from pasture and cropland, which accounted for over 40 percent of the downstream area in 2000, did have changes in rankings during the time-period.

As a final comparison, the water quality rankings by FDEP were reviewed for Joshua Creek, which has no phosphate mining influence. The long-term analyses indicate that the creek was ranked “good” in the 1970 and 1975 ranking. However, beginning in 1980, the ranking was “fair” and has continued in the “fair” category for years with sufficient data, which were 1990 and 1995. As shown in Table 4.26-22, the primary land cover in 2000 was cropland and pasture, which comprised approximately 42 percent of the basin and tree crops, which accounted for over 28 percent.

In summary, this cumulative water quality evaluation does not indicate significant increasing trends in streams highly influenced by mining for parameters showing overall increasing trends in the downstream portion of the Peace River basin. In other words, phosphate mining does not appear to have an adverse effect on water quality relative to turbidity, nitrate, nitrite, and chlorophyll-a. Therefore, the cumulative effects of continued mining and reclamation in the Peace River Basin area not expected to significantly influence these parameters in the future. The parameters showing increasing trends in streams highly influenced by mining at both mined area reviewed were DO and alkalinity, which is a net improvement to the receiving stream. The increasing trends for color and TOC were only observed at the mine exiting to Horse Creek. These parameters do not have water quality criteria, and their levels are not expected to be significant to the receiving streams. Since the increasing trends were only at the Horse Creek station, they may be attributed to the headwater conditions of the area, which are characteristic of swamplands. High color is typical of "blackwater" streams and range above 300 PTU's (FDEP, 1989), which is above the average for the Horse Creek station.

Biological Research Associates recently conducted a water quality study of the effects of phosphate mining and other land uses on tributaries of the Peace River. As part of the study, a large volume of data and reports covering almost 50 years of water quality information on the Peace River was reviewed as it relates to the phosphate mining industry. The study compared five-year averages of water quality data for four tributaries of the Peace River ranging from extensive influenced by phosphate mining (Payne Creek) to no influence by phosphate mining (Joshua Creek and Charlie Creek). The summaries were made for phosphorus, nitrogen, conductivity, pH, and dissolved oxygen. Of the parameters studied, phosphorus was highest in the Payne Creek watershed. However, the study found this elevated level may be attributed to the geology of the area, rather than being from the effects of mining. Total nitrogen and conductivity were highest in Joshua Creek. For pH, Payne Creek was highest and was similar to Joshua Creek. All streams were within the Class III standards. Dissolved oxygen levels were similar in all four tributaries, while the mean was slightly higher in Payne and Joshua Creeks. The study concluded that there were no indications of adverse changes in water quality as a result of mining and/or reclamation activity based on a comparison of Payne Creek which has experienced substantial nonpoint and point sources mining activity and streams that have no influence from mining (BRA, 2002).

4.26.3.2.3 Groundwater Quantity

There are three distinct aquifer systems in the proposed project area: 1) surficial aquifer system or SAS; 2) intermediate aquifer system or IAS, and; 3) Floridan aquifer system or FAS. Groundwater quality degradation from different sources of pollution and aquifer depletion or saltwater intrusion or upconing may occur as a result of the proposed project or other regional development. A detailed impact assessment was conducted as part of

DRAFT

the Areawide EIS prepared in 1978. In general, for regional groundwater maps evaluated in that study, more recent information has been compiled in this section to assess impacts of mining over the past two decades.

Although the surficial aquifer groundwater quality has the potential to be impacted from mining, the FDEP has concluded that the mine process water is not a threat to groundwater quality and has exempted phosphate mines from the requirements to conduct groundwater quality monitoring. Therefore, the cumulative impact assessment of the groundwater is focused on the FAS, since the withdrawal of water can cause regional water quality problems from upconing or saltwater intrusion. Information published by the SWFWMD, the USGS, and FDEP was used to evaluate cumulative impacts on groundwater in the FAS.

The UFA is generally used to withdraw water for agricultural, industrial and municipal water use in the region. For evaluating the impacts of the proposed water use from IMC's total operations in the phosphate area, a regional groundwater model was run as part of the SWFWMD permitting process. A review of the modeling by SWFWMD staff found the projected drawdowns to be of acceptable levels and the permit was issued. To evaluate the relative changes in groundwater quantity from all users over the past two decades, a comparison of the current potentiometric maps versus 1975 potentiometric maps of the region was performed. To evaluate the changes to the potentiometric surfaces from groundwater pumping, the water use information presented in Section 4.26.2.3.1 for 1975, current, and projected for the year 2020 was used.

The potentiometric maps for September 1975 and May 1976 (Figures 4.26-7 and 4.26-8, respectively) were compared to the potentiometric maps for September 1996 and May 1996 (Figures 4.26-9 and 4.26-10, respectively). The 1975 and 1976 maps were chosen, since they were included in the Areawide EIS. The 1996 maps were selected for comparison because the total rainfall for 1996 was similar to the 1975 rainfall total. A comparison of the May maps, which represent the dry season for this region, indicated a net improvement in potentiometric surfaces in the area northeast of the site, i.e. the area in southwestern Polk county and northern Hardee County. Some of these areas have shown increases of 30 feet in elevation over the period. In the area of the Ona project, the levels were similar during both periods. Another area of net improvement was west of the site in eastern Manatee County. In this area, changes were not as pronounced, but were approximately ten feet higher.

Similarly, a comparison of the September maps indicated a net improvement in the area described northwest of the Ona site for the May maps. The increases were in the 30-foot range in some areas of Polk County. The area west of the site, however, experienced a net decline of 10 to 20 feet. While the elevation of the potentiometric surface at the site was approximately the same during both periods, an area southeast of the Ona site

DRAFT

experienced a decline of approximately 10 to 15 feet that was approximately 10 to 15 feet above the earlier period in May. Figure 3.7-2 in Chapter 3.0 shows water levels in a well near the Ona site that fluctuated in approximately the same range of values over the 22-year monitoring period from 1977 to 1999. This observation is similar to the results of the comparison of the potentiometric maps.

The relatively large increases in the potentiometric surfaces for both May and September when comparing the mid 1970's to the mid 1990's in areas of the Peace River basin can be explained by a review of the changes in water use for the region presented in Table 4.26-7. The changes in water use by county indicate that the largest decreases in groundwater withdrawal occurred in Polk and Hardee Counties. For the agricultural category, the reduction in pumping in Hardee and Polk Counties accounted for over 150 mgd or approximately 88 percent of the decrease. Likewise, for the phosphate plants, industrial/commercial, and phosphate mining uses the reduction in Polk County accounted for approximately 225 mgd, which was 88 percent of the reduction for these three categories. Since a major portion of these uses occurred in southwestern Polk County, the increase in potentiometric surface in this area is attributed to the reductions in pumping.

The water use requirements for phosphate mining operations as they move south in the region are not expected to have significant adverse effects because 1) the pumping requirements for the new mines are much less than was needed for the earlier operations, 2) the regional modeling of the IMC operations, which account for a large portion of the overall mining and chemical plants in the region, demonstrated that drawdowns from pumping met the requirements for SWFWMD to issue a WUP, 3) the mining water use and chemical plants water use will continue to separate, since the chemical plants will remain in the north area of the phosphate district as mining progresses to the south. Therefore, water demands of the phosphate industry will not overlap as had occurred during the earlier stages of mining.

4.26.3.2.4 Groundwater Quality

The groundwater quality has been assessed by comparing regional water quality distributions of chloride, sulfate and dissolved solids in the UFA from Areawide EIS as depicted in Figures 4.26-11, 4.26-12, and 4.26-13, respectively, with a more recent FDEP groundwater study from the early 1990's showing regional distributions of the same parameters. The distribution of chloride, sulfate and total dissolved solids from the FDEP report are shown in Figures 4.26-14, 4.26-15 and 4.26-16, respectively.

Chloride is included because it is an indicator parameter of saltwater intrusion, which can occur from over pumping in an area. A comparison of the time-periods indicates that the chloride levels increased in the northwest section of Manatee County and in the central section of DeSoto County. The change in Manatee County was from approximately 50 mg/l to over 250 mg/l. Since 250 mg/l of chloride is a secondary drinking water standard, this increase denotes a change below groundwater quality standards. In the DeSoto County area, the change was from 50 mg/l to over 100 mg/l, but remained within standards. Neither of these changes is attributed to the progression of phosphate mining, which is distant from the areas of the increases. Figure 4.26-14 indicates that central Florida phosphate area has a concentration of approximately 10 mg/l, which is well within the groundwater quality standard.

Sulfate levels, which generally increase with depth in the FAS, were also compared for two time-periods. The figures indicate that the sulfate concentration have decreased from the southwestern portion of Polk County to the western portion of Manatee County. In areas of the central Florida phosphate district, the concentrations declined from 50 mg/l to approximately 10 mg/l. These values are well below the groundwater standard of 250 mg/l. However, the 250 mg/l contour has moved northward from the middle of Charlotte County to approximately the northern boundary of DeSoto County. In the northern portion of DeSoto County a localized 500 mg/l contour is attributed to pumping which may have caused the upconing of higher concentrations of sulfate from the underlying aquifer.

The third parameter compared between the two time-periods was total dissolved solids. The bands of concentrations from 250 mg/l to 500 mg/l were similar for the two time-periods. The slight difference in the shape of the two bands may be attributed to the different monitoring locations. Thus, this comparison indicates that no major changes in total dissolved solids have occurred as a result of phosphate mining in the region.

In conclusion, a comparison of water quality contours over a period of 20 to 30 years for chloride, sulfate, and total dissolved solids did not indicate any significant increases in concentration associated with phosphate mining in the region. Since water use for mining is not expected to increase significantly over the next two decades, future changes in groundwater quality as a result of phosphate mining in the region are not expected to occur.

4.26.3.2.5 Water Resources Summary

The cumulative water resources impacts from phosphate mining in the Peace River basin were evaluated by utilizing extensive water quantity and quality data collected over the past three decades. The water quantity assessment included an evaluation of water use and runoff. SWFWMD information indicated that the phosphate industry had reduced its water use by over 190 mgd from 1975 to 1999, which represents a 74 percent decrease in use. Water use for the phosphate industry is projected to remain low relative to historical use and relative to other users. Regional analyses of streamflow have indicated that the majority of the decrease in flow in the Peace River can be attributed to a regional reduction in rainfall. In addition, a comparison between three tributaries to the Peace

River did not indicate significant differences between runoff rates from extensively mined drainage basins and those with no mining.

Surface water quality data was also evaluated for the Peace River basin and the three tributaries. The cumulative water quality evaluation did not indicate significant increasing trends in the streams highly influenced by mining for parameters showing overall increasing trends in downstream portions of the Peace River basin. In other words, phosphate mining does not appear to have an adverse effect on water quality relative to turbidity, nitrate, nitrite, and chlorophyll-a. Therefore, the cumulative effects of continued mining and reclamation in the Peace River basin are not expected to significantly influence these parameters in the future.

The cumulative impact assessment for groundwater focused on the FAS, since the withdrawal of water can cause regional water quality problems from upconing or saltwater intrusion. A comparison of wet and dry season potentiometric maps representing a change over two decades indicated a net improvement in potentiometric surfaces in the phosphate region, which is partially attributed to the net reduction of pumping in the area. The water use requirements for the phosphate mining operations as they move south in the region are not expected to have significant adverse effects on the region. Similarly, a comparison of water quality contours over the past two to three decades for chloride, sulfate, and total dissolved solids did not indicate significant increases in concentration associated with phosphate mining in the region. Since water use for mining is not expected to increase significantly over the next two decades, future changes in groundwater quality as a result of phosphate mining in the region are not expected to occur.

4.26.3.3 Socioeconomic Resources

The socioeconomic impacts resulting from this and other developments are likely to be positive. Therefore, the cumulative impacts to socioeconomic resources of the region were evaluated by looking at economic growth of the area, including the positive impact on the Port of Tampa.

The cumulative impacts of the proposed Ona mine on the local and regional socioeconomic resources are presented below. This assessment includes direct socioeconomic impacts as a result of actions taken by IMC associated with the proposed action. The assessment also considered indirect socioeconomic impacts that result from actions taken by parties other than IMC.

4.26.3.3.1 Employment

No significant increase in direct employment by IMC would occur in Hardee and Polk Counties. The ability however to maintain mining operations by shifting employment from the depleted Fort Green Mine to a new mine would provide a continuum of overall employment at the mine, as well as for the beneficiation operations. At present, the mining and beneficiation operations at Fort Green employ approximately 400 people, with 75 of these employees residing in Hardee County. This direct employment number represents 11.6 percent of the mining employment reported in the region (Florida Research and Economic Database [FRED], 2001a).

Within the region, the overall employment in the nonmetallic minerals sector is reported at 3,454 employees, with 90 percent (3,119) of those jobs being located in Polk County (FRED, 2001a). The importance of the phosphate industry to the region and Polk County employment base is significant. Over 56 percent of the nonmetallic mineral jobs in the state are located in the region and Polk County's employment represents 50 percent of these jobs statewide.

Despite the significance that Polk County and the region has on the overall statewide employment base for nonmetallic minerals, the projections for future employment show a significant decrease. Statewide employment is anticipated to decrease by almost 14 percent to 5,336 jobs. This is a direct result of a reduction in mineral mining in Polk County, which is projected to lose 903 jobs. Elsewhere in the region, nonmetallic mineral employment is expected to increase from 335 jobs at present to 426 jobs in 2008 (FRED, 2001a). The projected trend in Polk County is a continuation of the recent trend in phosphate employment in the county over the past several decades. Polk County employment in both mines and chemical plants decreased from 6,769 jobs in 1992 to 5,111 jobs in 1999 (Florida Phosphate Council, 2001). The CFRPC expresses concern over the decline in high wage categories in the Economic Development section of the SRPP. The plan notes "*The Region has been losing high paying jobs in mining and manufacturing, while more and more people are employed in the lower paying service industries. Thus, growth in wage and salary earnings per capita has declined*" (CFRPC, 1997). Among the fundamental goals of the CFRPC is to sustain county and municipal economic development

While the significance of direct employment resulting from the project is less in the region due, in part to the size of the overall regional economy relative to direct employment, the cumulative impact of phosphate mining impact is significant due to the indirect benefits associated with various businesses that support the entire industry. The Florida Phosphate Council reports that for every phosphate employee, five additional jobs are created in support of the direct employment (2001). As a result of this multiplier effect, the continuation of employment related to the Ona Mine would allow an additional 2,000 indirect jobs to be maintained, with most of these jobs located in the region.

Worldwide demand for fertilizer use is expected to increase from 138 million tons at present to 179 million tons by 2030 to satisfy the increase in cereal and feed demands for an increase in population and an improvement in overall standard of living in developing countries (International Fertilizer Industry Association, 2001). With Florida providing approximately 75 percent of the US phosphate supply (and 25 percent of the world supply), it is strategically important to maintain the existing employment base in order to provide products for both domestic consumption and export (Florida Phosphate Council, 2001).

4.26.3.3.2 Wages and Payroll

The cumulative effect of the proposed project on wages is also a significant economic benefit. The 1997 statewide average annual wages for various occupations were compared (Table 4.26-34). This comparison showed that statewide employment within the mining industry constituted about 0.1 percent of all jobs in the state. Additionally, the data shows that wages within the mining industry are among the highest in the state with an average annual wage of $39,120. This was well over twice the lowest average, which is for the retail industry.

This is indicative of the relative value of phosphate mining jobs and the phosphate mine worker. The ability to maintain these types of jobs in the region helps offset the decline in high wage categories that the region as a whole, and particularly Polk County, are experiencing.

Overall, employment in the phosphate industry in the state represented a payroll of $415.9 million dollars in 2000 (Florida Phosphate Council, 2001). There are 54,000 jobs created in Hillsborough County by port-related activity in Tampa. The role of phosphate is the most significant single industrial activity, accounting for a significant volume of export of ore and phosphate products and import of liquid sulfur and ammonia. Approximately 25,000,000 tons of phosphate related products were shipped from the port last year. This number represents about 40 percent of the total liquid and bulk tonnage shipped by the port (Tampa Port Authority, 2001; Florida Phosphate Council, 2001).

4.26.3.3.3 Ad valorem Revenue and Taxes

Ad valorem tax revenue from the existing beneficiation plant in Polk County generates $27,000 annually (based on an assessed value of $1,500,000 and a Polk County year 2000 millage rate of 17.666). Ad valorem revenue to Hardee County for the mine portion of the project would begin during the initial year of mining and continue on an annual basis during the mine life. Once the beneficiation plant is constructed in Hardee County, additional ad valorem revenue would be generated in the county and disbursed to the General Fund, School Board, and Southwest Florida Management District. In addition to ad valorem revenue, the county would receive other fees including mining regulation fees (in lieu of impact fees for mine disturbance), annual review and monitoring fees, and amendment fees. Tax proceeds to Hardee County also include severance tax receipts

Ad valorem taxes paid by the phosphate industry in Polk County is significant, with four of the top ten assessments related to the industry. In 2000, IMC paid $5,600,000 to the county (Polk County Property Appraiser Office, 2001). The cumulative fees paid to the county by IMC, Cargill Fertilizer, Farmland Hydro, and US Agrichemicals Corporation total $13,300,000. Assuming the basic breakdown in Polk County ad valorem taxes to be 60 percent to County General Fund, 30 percent to the School Board, and 10 percent to SWFWMD, the year 2000 revenue total for Polk County's four phosphate assessments would be allocated as follows:

- $ 5,985,000 to County General Fund
- $ 6,783,000 to School Board
- $ 532,000 to SWFWMD

Indirect ad valorem revenue from businesses that are located to support the phosphate industry would supplement these totals, as would each employee who resided in Polk County in a single-family dwelling. A similar revenue scenario occurs in other counties in the region that are occupied by phosphate businesses, businesses that support the phosphate industry, or are home to employees that work in the industry or related businesses. Impact fees, property taxes and sales tax would accrue to all counties in the region as a result of indirect employment and investments associated with the new mine, and the existing and proposed beneficiation facilities. Cumulative direct and indirect tax revenue for the phosphate industry in the region has not been determined recently, but could represent tens of millions of dollars on an annual basis.

Statewide, over $95,400,000 in taxes and fees was paid by the phosphate industry in 2000. Severance taxes paid totaled $41,579,076 and were used to 1) acquire environmentally sensitive land under the Conservation and Recreation Lands Trust Fund, 2) supplement the state's general revenue fund, 3) supplement the general fund in counties where phosphate mining occurred, or 4) funded the Florida Institute of Phosphate Research. Property taxes paid in 2000 totaled $33,169,916. Sales taxes paid totaled $17,899,309. Other taxes and fees represent the remainder of the industry's contribution (Florida Phosphate Council, 2001).

4.26.3.3.4 Other Socioeconomic Considerations

Cumulative impacts associated with other socioeconomic components are insignificant due primarily to the fact that employment would not be significantly increased. As a result there would be no significant direct or indirect increase in population, housing, need for

DRAFT

community facilities such as potable water, sanitary wastewater, solid waste management services, highway, rail or port traffic, or energy supply. Similarly, there would be no significant direct or indirect impact to community services such as education, recreation and public safety (law enforcement, fire protection, and EMS). Due to the fact that the proposed project would allow baseline economic activity to continue even cumulative impacts associated with indirect economic aspects of the project, while considered a significant benefit, would be a continuation of existing levels of economic activity.

4.26.3.3.5 Socioeconomic Resources Summary

The primary socioeconomic benefit that would result from the estimated 24-year mining duration at Ona Mine is direct and indirect economic benefits. These benefits would be derived in the form of employment, wages and payroll, and ad valorem revenue and taxes.

When considering the cumulative socioeconomic effect of the proposed Ona Mine when combined with the two projects identified within a one-mile radius of the site boundaries, there is little change. The number of employees at the power plant is less than 25 and at the assisted living facility is expected to be low because, according to the Hardee County permit, it only has eight housing units. Since the overall socioeconomic effect is beneficial, no additional analysis was conducted.

4.26.3.4 Land Use

To assess the potential for phosphate mining to have a cumulative impact on changes in land use within the Peace River basin, a comparison was made of the 1975, 2000, and 2025 land use/cover maps generated as part of the CFRPC's cumulative impact study. The study area used in this analysis is approximately 1,502,300 acres.

For this analysis cover types were combined into Urban/Infrastructure (FLUCFCS 100 [less 160] and 800), Agricultural (FLUCFCS 200), Undeveloped (FLUCFCS 300, 400, 500, 600, and 700), and Extractive (FLUCFCS 160). A comparison was made of the change in acres of Undeveloped, Extractive, Urban/Infrastructure, and Agricultural land use/cover classifications to determine the cumulative impacts of land use change associated with each.

By comparing this data for 1975, 2000, and 2025 it is clear that there is a gradual change in the dominant land use/cover classifications over this timeframe. Land use/cover dominance within the study area in 1975 was Undeveloped (52 percent), Agricultural (37 percent), Urban/Infrastructure (6 percent), and Extractive (5 percent).

In 2000 the Undeveloped land use/cover classification was reduced to 38 percent of the area, while Agricultural and Urban/Infrastructure land uses had increased to 46 and 12 percent, respectively. Extractive land use remained 5 percent in 2000. Data presented in

Table 4.26-35 show that between 1975 and 2000 areas classified as Undeveloped decreased by 28 percent, and Agricultural areas increased by slightly less than 25 percent. The most striking change was in Urban/Infrastructure, which nearly doubled (95 percent increase) during the 25-year period. Extractive land use remained the same.

In 2025 the areas classified as Agricultural are projected to be 35 percent of the study area, Undeveloped is 35 percent, Urban/Infrastructure has increased to 26 percent, and Extractive land use is down to 2 percent. Once again there is a decline in areas classified as Undeveloped, and an increase in Agricultural and Urban/Infrastructure. The data in Table 4.26-35 show a 7 percent decrease in areas classified as Undeveloped. Interestingly, there is also a 20 percent decrease in Agricultural areas. Both of these classifications are displaced by a 120 percent increase in Urban/Infrastructure land use/cover. The Extractive classification also decreases by 57 percent.

From 1975 to 2025, the increase in the number of acres in Agricultural or Urban/Infrastructure land use/cover is greater than the number of acres of undeveloped land that was lost. Therefore, the analyses show that cumulative impacts on land use change within the Peace River basin is greater from the conversion of land to Agricultural or Urban/Infrastructure land use/cover than for Extractive uses, such as phosphate mining. Thus, the potential impact of the proposed action on cumulative land use trends in the study area is minimal.

4.27 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.27.1 Proposed Action Alternative

4.27.1.1 Ecology

The productive capability of reclaimed upland systems for agriculture would be similar to existing systems. Creation of lakes and associated wetland areas as part of reclamation would result in no net loss in productivity as compared to pre-mining conditions, and would increase the habitat diversity and species diversity in the area. The reclaimed lakes would provide more habitat for fish, lentic macroinvertebrates, and species associated with lake margins and littoral zones such as reptiles, amphibians, wading birds, ducks, and macroinvertebrates.

Agricultural land use would be lost in the areas that would be reclaimed as lakes. Mining would also result in the loss of individual fauna in affected areas, temporary habitat destruction, replacement of some upland habitat with lake systems, and temporary alteration of the functions provided by wetlands and aquatic systems.

4.27.1.2 Water Resources

The capture of streamflow during mining activities, the discharge of water during periods of excess rainfall, and the changes to drainage basin characteristics from reclamation after mining will result in changes to surface water quantity and quality of onsite streams.

The SWFWMD WUP authorizes an average pumping rate of 10 mgd from the groundwater resources at the Ona site. Assuming the plant begins operation in Year 3 of the mine and continues through Year 30, the volume of water withdrawn from the Floridan Aquifer would be approximately 102 billion gallons over the 28-year life of the Ona plant site. However, since the Ona plant site will replace the existing Fort Green plant, a corresponding reduction of a similar quantity would be expected to the north of the Ona site at the Fort Green site.

4.27.1.3 Phosphate Reserves

The principal geologic resources at the Ona site are the mineable phosphate rock deposits and the limestone and dolomite layers beneath the phosphate that provide potable water. The Ona site contains over 140 million tons of recoverable, marketable phosphate rock. IMC Phosphates is proposing to extract about 105 million tons of the resource, or about 75 percent (IMC, 2002).

The remainder of the resource, or about 35 million tons, would be left in the ground and essentially lost due to the other natural resources that overlie the geological resources. Protection of the other environmental or natural resources would essentially occur on lands where the cost of attempting to mitigate mining impacts would exceed the value of the phosphate. That is, the value of the natural resources or ecology is considered by the AWG to be higher than the value of the geologic resources (IMC, 2002).

4.27.2 IMC's Original Area to be Mined Alternative

Under this alternative, irreversible and irretrievable commitment of resources would be similar in nature to those described for the Proposed Action Alternative.

4.27.3 Natural Systems Group Recommended Areas of Conservation Interest

Under this alternative, irreversible and irretrievable commitment of resources would be similar in nature to those described for the Proposed Action Alternative.

4.27.4 No USACE Jurisdictional Wetlands Impacts Alternative

Under this alternative, irreversible and irretrievable commitment of resources would be similar in nature to those described for the Proposed Action Alternative. However, because the scale of this alternative is less than the proposed action, the scale of the impacts would also be less.

DRAFT

4.27.5 No Action Alternative

In general, no irreversible and irretrievable commitment of resources is anticipated under this alternative. However, if the area were developed for intensive agricultural, residential, or urban land uses in the future, the phosphate resources that underlay the site would be lost.

4.28 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

4.28.1 Proposed Action Alternative

4.28.1.1 Topography and Soils

The acreage needed for the clay settling areas is estimated to be 6,269 acres, which includes 4,602 acres for clay storage and 1,667 acres for the footprint of the dikes. The final settled elevation of approximately 3,000 acres of land would be approximately 20 feet above-grade. Although the changes in topography would cause the drainage area boundaries and sizes to be altered slightly from existing conditions, in general, the site would be returned to the same relatively flat topography as currently exists.

Of the 20,676-acre Ona site, 15,527 acres would mined. In the mined areas, the characteristics of the existing soils would be changed by the reclaimed soils, which include 7,989 acres of tailings with overburden cap, 3,685 acres of settled clay, 386 acres of tailings, and 3,790 acres of overburden. During mining, soil erosion from water and wind are anticipated in unvegetated areas. The capture of runoff into the mine recirculation system is expected to prevent erosion from degrading local water quality in streams. Potential off-site impacts from wind erosion would be minimized by providing set-backs at property boundaries.

4.28.1.2 Upland Ecology

Unavoidable impacts on upland communities include temporary reductions in flora and fauna populations due to land clearing and mining activities. Reclamation plans include an increase in acreage of upland forest and a net decrease in agricultural lands. While upland wildlife species would be temporarily displaced during active mining, the post-reclamation landscape would provide suitable habitat for the continued existence of wildlife resources. In addition, the proposed Conservation Easements would assure that wildlife habitat is preserved in perpetuity upon the completion of mining. The spatial configuration of undisturbed and reclaimed areas in the post-mining landscape provides contiguous corridors of habitat that improve upon the existing patchy distribution of natural areas at the Ona site.

4.28.1.3 Wetlands

Impacts on wetlands flora and fauna would be similar to impacts on uplands communities, as site preparation for mining would displace wildlife and result in the loss of plant communities. As with uplands, the impacts are temporary in nature, as reclamation activities would result in an increase of wetland acreage. Until reclaimed systems mature, wildlife populations may be reduced, although significant acreage of wetland habitat is proposed to remain undisturbed during the lifetime of the mine, and the active clay settling areas provide a sizeable habitat that is used by many species. Population shifts may occur due to creation of wetland systems (e.g. lake edge wetlands), which are presently limited in the project area.

4.28.1.4 Aquatic Communities

Mining of aquatic habitats would result in temporary reductions in associated flora and fauna. Addition of the ditch and berm system, creation of reclaimed lakes, and reclaimed wetlands would result in a net increase in aquatic habitats upon completion of mine reclamation. The significant natural streams and associated floodplains would not be disturbed, and secondary impacts of mining adjacent to these streams would be avoided through the ditch and berm recharge system. Only portions of the agriculturally altered Oak Creek are proposed to be mined, and would be reclaimed to a more diverse aquatic system of marshes and forested stream floodplain.

4.28.1.5 Rare and Endangered Species

Some populations could decline as a result of mining, whereas others may actually increase as a result of the creation of over 1,000 acres of lakes and the establishment of permanent Conservation Easements. Pre-clearing surveys and relocation methods would be utilized to avoid the taking of any listed species, and large areas of high quality habitat would be preserved during mining that may be used as refugia for listed species.

4.28.1.6 Surface Water Quantity

Unavoidable environmental impacts on surface water flows would result from some areas of land periodically being removed from the natural drainage systems. Runoff would be reduced in the streams since some areas would be isolated from the natural drainage basins and would not contribute runoff to their flow. Rain falling within the mining and disposal areas would be captured in the mine recirculation system for use in the mining operations. However, the stream baseflows along floodplains, or wetlands left undisturbed that are near an excavated open mine cut would be maintained during mining and would offset impacts to natural low flows. In addition, NPDES discharges back into Horse Creek and Brushy Creek would offset much of the reduction from the capture of surface water during higher flow periods. Streamflows after reclamation are expected to be approximately one cfs less than pre-mining primarily because of the increased evaporation caused from the addition of lakes to the site. The lakes are part of the reclamation plan and were requested by Hardee County. Impacts on the Horse Creek and Peace River water budget are expected to be minimal.

4.28.1.7 Surface Water Quality

Water quality impacts from the clearing of vegetation from the land should be avoided since runoff from these areas would be captured in the mine recirculation system prior to disturbance. The quality of water discharged from the NPDES outfalls is not expected to adversely affect the water quality in Horse Creek and Brushy Creek. The potential increase for dissolved oxygen and pH from NPDES discharges relative to the existing stream water concentrations would generally improve water quality conditions within the streams and has the potential to reduce the number of naturally occurring water quality contraventions of Class III criteria. The potential increases in conductivity are not expected to approach limiting Class III standards. The potential increase in phosphorus concentrations are not a concern as the systems would be nitrogen limited and would not develop excessive plant growth beyond the amount of available nitrogen in the system. Therefore, the impacts to stream water quality are expected to be minimal.

4.28.1.8 Groundwater

Groundwater impacts from mining include a lowering of the SAS and FAS during mining. Dewatering mining areas would cause a temporary and local lowering of the SAS. The groundwater inflow/outflow to areas along floodplains, or wetlands to remain undisturbed that are near an excavated open mine cut would be maintained by a BMP ditch and berm or recharge well system. The groundwater outflow to protected areas would be maintained by keeping a high level of water in the ditch adjacent to the protected areas. These areas include protected streams and wetlands, which would maintain baseflows in unmined creeks.

Groundwater potentiometric levels in the FAS would be reduced near the pumping wells for water for the plant operations. The SWFWMD has determined that the drawdowns caused by the proposed pumping would not cause adverse affects to adjacent property owners and has issued a WUP for the site. Therefore, no significant adverse impacts are expected.

4.28.1.9 Air quality

A temporary increase in total suspended PM levels is anticipated in the vicinity of the mining activities. However, PM levels should be reduced when mining activities are completed in an area, and would return to areawide background levels when reclamation is completed. No exceedances of any ambient air quality standard or long-term impacts to regional ambient air quality are anticipated.

DRAFT

4.28.1.10 Radiation

Typical concentrations of Radium-226 in phosphate ore and in various products and by-products of the beneficiation process indicate that most of the Radium-226 tends to remain with the rock and the clay wastes. The radium also tends to remain bound to the particles in these materials and does not dissolve readily. The expected concentrations of radiation on the clay settling areas after reclamation would be higher than the existing conditions and other reclaimed areas of the site. If needed, Radon Resistant Construction Techniques such as those developed by the USEPA and BRC could be used to protect homes and buildings from indoor radon hazard.

4.28.1.11 Historic Resources

As described in Section 4.16.1, site 8HR779 was identified and considered potentially eligible for listing in the NRHP (SAR, 1999). IMC proposes to conduct Phase II testing of the site to determine its eligibility for listing in the NRHP. If the site were determined eligible, IMC would proceed with data recovery from this site to mitigate any impact and to obtain concurrence from the SHPO that mining activities would not have an adverse effect. These activities and coordination under Section 106 of the NHPA would be completed prior to conducting any ground-disturbing activities in the area (IMC, 2002). Therefore, no unavoidable adverse impacts on archaeological resources or historical structures are anticipated.

4.28.1.12 Socioeconomics

There are no unavoidable adverse economic impacts associated with this project. However, once the mining operations are concluded, the mining jobs and tax revenue would be lost. Nonetheless, the longer the facility is in operation, the longer the economic benefits to the county, region, and state would be received.

4.28.2 IMC's Original Area to be Mined Alternative

Under this alternative, unavoidable adverse environmental effects would be similar in nature to those described for the Proposed Action Alternative.

4.28.3 Natural Systems Group Recommended Areas of Conservation Interest

Under this alternative, unavoidable adverse impacts would be similar in nature to those described for the Proposed Action Alternative.

4.28.4 No USACE Jurisdictional Wetlands Impacts Alternative

Under this alternative, unavoidable adverse environmental effects would be similar in nature to those described for the Proposed Action Alternative. However, because the scale of this alternative is less than the proposed action, the scale of the impacts would also be less.

DRAFT

4.28.5 No Action Alternative

Under this alternative, unavoidable adverse environmental effects would be the loss of jobs, taxes, and economic multipliers to Hardee and Polk Counties and the central Florida region. The Florida Phosphate Council reports that employment in the phosphate industry in the state represented a payroll of $415.9 million dollars in 2000 and that for every phosphate employee, five additional jobs are created in support of the direct employment (Florida Phosphate Council, 2001). As a result of this multiplier effect, the loss of jobs currently located at the Fort Green Mine that would transfer to the Ona Mine could result in the loss of an additional 2,000 indirect jobs, most of which are located in the region.

4.29 LOCAL SHORT-TERM USES AND MAINTENANCE/ENHANCEMENT OF LONG-TERM PRODUCTIVITY

4.29.1 Proposed Action Alternative

4.29.1.1 Ecology

The productive capability of reclaimed upland systems for forestry and agriculture would be similar to existing systems. Creation of lakes and associated wetland areas after mining would result in a net increase in aquatic habitat and species diversity as compared to pre-mining conditions. The reclaimed lakes would provide habitat for fish, lentic macroinvertebrates, and species associated with lake margins and littoral zones such as reptiles, amphibians, wading birds, and ducks. There would also be additional habitat available for populations of game and migratory species and any rare and endangered species that use aquatic habitats.

The reclaimed landscape is designed to provide contiguous parcels of natural lands, rather than the patchy distribution of natural areas separated by agricultural lands currently present at the Ona site. IMC has proposed to grant perpetual conservation easements on approximately 4,482 acres of land on and adjacent to the Ona site. These conservation easements include the floodplains of Horse, Brushy, and Oak creeks as well as an East-West corridor from Brushy Creek west towards Horse Creek. The conservation easements provide for the permanent protection of a mosaic of vegetative communities including xeric and wetland habitats, and would allow unrestricted wildlife movement along corridors of natural lands. Additionally, the proposed conservation easements include lands that are known to support listed species of plants and animals, and would assure their continuing existence at the Ona site in perpetuity.

4.29.1.2 Water Resources

In the short-term, the mining and processing of phosphate ore at the Ona site would result in changes to the surface water quantity and quality. Average flows and flood flows would be reduced during mining due to a reduction in the drainage areas being captured in the mine recirculation system. However, baseflows would be maintained by keeping a high level of water in ditch systems constructed adjacent to the protected areas. Water quality changes would occur in receiving streams and several parameters such as dissolved oxygen and pH, are expected to improve during periods of discharge. Other parameters expected to increase include conductivity, sulfate, and phosphorus. Fluoride levels are expected to decrease during periods of discharge. However, mining is not expected to cause any violations of Florida surface water or groundwater quality standards.

Long-term changes that may affect surface water resources include alterations to topography, drainage basin areas, land cover and soils characteristics. The runoff quantities from reclaimed clay settling areas would increase due to lower infiltration rates. However, reclaimed wetland areas downstream would offset these quantities by regulating flow thus, reducing the peak flow during storms. After reclamation, land cover would be similar to pre-mining conditions with the exception of an increase in the area of lakes. This increase in lakes would result in an increase in evaporation, which is estimated to reduce on-site runoff by 1 cfs. This reduction is not expected to have any significant impacts on Horse Creek or the Peace River. The reclamation of the Oak Creek floodplain to a more natural condition than presently exists, would provide improved flood protection and a natural filtering, which is expected to improve water quality in the creek.

4.29.1.3 Socioeconomics

Under the Proposed Action Alternative, mining at Ona would provide continued employment for Fort Green personnel and would sustain IMC's economic contribution to the long-term economic growth of Hardee County and the state for over 20 years.

4.29.2 IMC's Original Area to be Mined Alternative

Under this alternative, short-term and long-term adverse and beneficial impacts would be similar to those described for the Proposed Action Alternative.

4.29.3 Natural Systems Group Recommended Areas of Conservation Interest

Under this alternative, short-term and long-term adverse and beneficial impacts would be similar to those described for the Proposed Action Alternative.

4.29.4 No USACE Jurisdictional Wetlands Impacts Alternative

Under this alternative, short-term and long-term adverse and beneficial impacts would be similar to those described for the Proposed Action Alternative.

4.29.5 No Action Alternative

Under the No Action Alternative, there would be no mining at the Ona site. There would be an economic impact to the local and regional economy due to the loss of existing mining jobs in the area. There may be some additional indirect impacts if the employees move their households out of the area to find employment elsewhere, which would result in loss of spending within the local economy. Additionally, the state would experience an economic impact from the loss of tax revenues. These economic impacts could have a long-term impact on the economic growth of Hardee County.

4.30 GROWTH INDUCED EFFECTS

4.30.1 Proposed Action Alternative

The Proposed Action Alternative would not cause any induced growth in the project area. Personnel currently working at the Fort Green Mine would transfer to the Ona Mine. Therefore, it is unlikely that any additional personnel would move into the area creating demand for housing and services.

When the beneficiation plant is constructed at the Ona site, potable water would be provided by a well on the site. Likewise, a septic system would be constructed. No public utilities would be extended to the site. Electrical power is already available in the area and would be extended from the existing lines at the Fort Green Mine. Once mining is completed, the entire site, including the plant site, would be reclaimed and offered back to the original owner. It is assumed that the site would revert to use for agricultural purposes. Should any part of the site be developed for other purposes, such development would need to be in accordance with Hardee County plans and regulations. Therefore, no growth inducing effects are anticipated.

4.30.2 IMC's Original Area to be Mined Alternative

Growth induced effects under this alternative would be similar to those discussed for the Proposed Action Alternative.

4.30.3 Natural Systems Group Recommended Areas of Conservation Interest

Growth induced effects under this alternative would be similar to those discussed for the Proposed Action Alternative.

4.30.4 No USACE Jurisdictional Wetlands Impacts Alternative

Growth induced effects under this alternative are similar to those discussed for the Proposed Action Alternative.

4.30.5 No Action Alternative

Growth induced effects are not likely under the No Action Alternative. However, development pressure for conversion of agricultural land to rural residential (5-20 acre ranchettes) is evident a few miles to the west along SR 64. The proposed project site could be susceptible to this same development pressure.

DRAFT

4.31 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

4.31.1 Proposed Action Alternative

The CDA provided a detailed analysis about the compatibility of IMC's proposed action with the 1) goals and objectives contained in the CFRPC SRPP; 2) the goals and objectives contained in the Hardee County Comprehensive Plan; and, 3) the State Comprehensive Plan. For the details of this analysis, the reader is directed to Question 10, Part 2 of the CDA (IMC, 2002).

As discussed in Section 4.13.1.1, IMC's plans to mine and reclaim the Ona site are consistent with the CFRPC's April 1997 SRPP. The SRPP is a long-range guide for the physical, economic, and social development of the region, and the protection of regionally significant resources. The SRPP implements and furthers the goals and policies of the State Comprehensive Plan. As stated in the CDA, IMC's proposed action is also compatible with the State Comprehensive Plan (IMC, 2002)

IMC is requesting a Major Special Exception Use Permit from Hardee County Planning and Zoning Board and the Board of County Commissioners to rezone the Ona site to allow implementation of IMC's Ona mining and reclamation plans. However, IMC's plans were found to be consistent with the Hardee County Comprehensive Plan and the Hardee County Mining Ordinance, which are the principal land development regulations that address phosphate mining in Hardee County.

The compatibility of the Proposed Action Alternative with federal laws, regulations, and EOs is discussed in Section 4.36.

4.31.2 IMC's Original Area to be Mined Alternative

This alternative is also compatible with the CFRPC SRPP, the Hardee County Comprehensive Plan and Mining Ordinance, and the State Comprehensive Plan. The compatibility of this alternative with federal laws, regulations, and EOs is discussed in Section 4.36.Natural Systems Group Recommended Areas of Conservation Interest

This alternative is also compatible with the CFRPC SRPP, the Hardee County Comprehensive Plan and Mining Ordinance, and the State Comprehensive Plan. The compatibility of this alternative with federal laws, regulations, and EOs is discussed in Section 4.36.

4.31.3 No USACE Jurisdictional Wetlands Impacts Alternative

This alternative is also compatible with the CFRPC SRPP, the Hardee County Comprehensive Plan and Mining Ordinance, and the State Comprehensive Plan.

DRAFT

4.31.4 No Action Alternative

Since the No Action Alternative would be maintaining the status quo, it is compatible with the CFRPC SRPP, the Hardee County Comprehensive Plan and Mining Ordinance, and the State Comprehensive Plan. However, the loss of jobs and tax revenue to the county that would result is not compatible.

4.32 CONFLICTS AND CONTROVERSY

4.32.1 Proposed Action Alternative

As described earlier in this document, an intensive public and agency scoping process involving numerous meetings and field trips, contributed to the development of IMC's Proposed Action. Initially IMC proposed to mine 17,593 acres of the entire 20,676 acres at the Ona site. Between August 1999 and February 2000, AWG and PWG members attended additional meetings and site tours. As described in Section 2.4.3, these groups identified "areas of conservation interest," and suggested an alternative to mine only 12,969 acres, and preserve the rest of the site.

To address the concern over preserving areas of conservation interest, over time IMC developed the Compromise Area Alternative, which would disturb approximately 15,836 acres of the Ona site. IMC's proposed mining area is a compromise to mine part of the ore reserve while conserving much of the natural ecosystem. This alternative would not disturb 1,448.7 acres of wetlands, or about 36 percent of all wetland areas on the site. In addition, mining related activities would not disturb 30.7 acres of open water, 3,359.2 acres of uplands, and one acre of barren land or roadways, for a total of 4,839 acres or about 23 percent of the entire Ona site. This total includes lands considered as "areas of conservation interest," as well as land within property line setbacks or natural and improved lands that are not economically mineable. The "areas of conservation interest" include xeric forests, pine flatwoods, palmetto prairie, and wetlands.

Two primary issues were raised through the AWG/PWG process, as well as in the comments received in response to the NOI. These two areas of controversy are 1) the perceived need for a cumulative assessment of phosphate mining in central Florida, and 2) water balance and water quality, particularly relative to downstream water supply.

The CFRPC and other entities are currently conducting a regional assessment of cumulative impacts from phosphate mining in central Florida. The results of this assessment were not available at the time this EIS was written. However, the EIS team coordinated with the team conducting the CFRPC study and utilized data from that analysis as part of the cumulative impacts assessment for this EIS. Cumulative impacts are discussed in Section 4.26 of this EIS.

Impacts relative to water balance and water quality were assessed as part of this EIS and are described in Sections 4.5, 4.6, and 4.7.

4.32.2 IMC's Original Area to be Mined Alternative

Potential conflict and controversy associated with this alternative would be similar to those described for the Proposed Action Alternative. The scale of the project would likely mean that the degree of controversy associated with it is potentially more than with the proposed action.

4.32.3 Natural Systems Group Recommended Areas of Conservation Interest

Potential conflict and controversy associated with this alternative would be similar to those described for the Proposed Action Alternative. The scale of the project, as well as the fact that this alternative was developed with the AWG, would likely mean that the degree of controversy associated with it is less than with the proposed action.

4.32.4 No USACE Jurisdictional Wetlands Impacts Alternative

Potential conflict and controversy associated with this alternative would be similar to those described for the Proposed Action Alternative. The scale of the project would likely mean that the degree of controversy associated with it is less than with the proposed action. Additionally, since there would be no USACE jurisdictional wetland impacts, no Section 404 permit would be required. The controversy associated with impacts to and reclamation of wetlands and wetland habitats would be eliminated.

4.32.5 No Action Alternative

The No Action Alternative could result in conflict or controversy over the loss of jobs, tax revenue, and other economic benefits to Hardee County, the region, and the state.

4.33 UNCERTAIN, UNIQUE, OR UNKNOWN RISKS

4.33.1 Proposed Action Alternative

As with any large project, there is the potential for public safety to be an issue. Three areas of concern relative to public safety include: 1) catastrophic dam failure; 2) on-site accident; and, 3) on-site preparedness. These concerns and IMC's proposed plan for prevention and/or response are described in detail in Section 4.17.1.

4.33.2 IMC's Original Area to be Mined Alternative

Potential impacts and mitigation for the IMC's Original Area to be Mined Alternative would be similar to those described for the Proposed Action Alternative.

DRAFT

4.33.3 Natural Systems Group Recommended Areas of Conservation Interest

Potential impacts and mitigation for the Natural Systems Group Recommended Areas of Conservation Interest Alternative would be similar to those described for the Proposed Action Alternative.

4.33.4 No USACE Jurisdictional Wetlands Impacts Alternative

Potential impacts and mitigation for the No USACE Jurisdictional Wetlands Impacts Alternative would be similar to those described for the Proposed Action Alternative.

4.33.5 No Action Alternative

No mining activities would occur at the Ona site under this alternative, therefore, there would be no uncertain, unique, or unknown risks.

4.34 PRECEDENT AND PRINCIPLE FOR FUTURE ACTIONS

The proposed action and alternatives for this project were compared to current practices used by the phosphate industry and recommended by FIPR research. Section 2.2 Mining Techniques Considered, describes these practices and their environmental and technical considerations. All of the practices proposed for this project conform to the industry standards and do not set a new precedent for future mines.

4.35 ENVIRONMENTAL COMMITMENTS

4.35.1 Proposed Action Alternative

Exhibit B of the Ecosystem Management Agreement for this project states:

> *"Net ecosystem benefit" means that review under this process must produce a result more favorable to the ecosystem than conventional reviews. Far from compromising their substantive standards of review, participants look for ways to exceed them. In order to obtain the coordinated and concurrent review, the applicant must show that such a benefit is likely before the agencies and jurisdictions agree to enter into process. The following opportunities for net benefit to the greater Peace River ecosystem have been discussed by the participating agencies, jurisdictions, and IMCAgrico, and have been deemed sufficient to warrant an ecosystem permitting approach to reviewing the applications. Additional opportunities will continually be sought as the process moves forward.*

- *Holistic focus on ecosystem-wide impacts and benefits, considering factors both inside and outside the project boundaries.*
- *Formalized, early, and continuing public participation.*

DRAFT

- *Establishment and long-term protection of a greenway or integrated habitat network on IMC-Agrico property, both inside and outside the project boundaries.*
- *Restoration of areas currently in agriculture to upland habitat and connections.*
- *Restoration of some historic water flow and hydrology in the Peace River System.*
- *Improvement of recreational opportunities.*
- *Evaluation of opportunities to coordinate with the Southwest Florida Water Management District's Comprehensive Surface Water Management Initiative."*

The NEBs fall into two basic categories: 1) Items that have true Ecosystem Benefit; and, 2) Items that have Community Value or public interest and benefit.

The proposed NEBs have varying economic cost and value. IMC has included generalized estimates of economics, where appropriate. IMC does not intend to rank proposed NEBs in terms of their costs. However, cost is one component that must be considered. In addition, some of the NEBs do not meet the literal definition of Ecosystem Benefits but are more of a Community Value enhancement. The NEBs for the Proposed Action are included in Appendix F.

4.35.2 IMC's Original Area to be Mined Alternative

Under this alternative, environmental commitments would similar to those described for the Proposed Action Alternative.

4.35.3 Natural Systems Group Recommended Areas of Conservation Interest

Under this alternative, environmental commitments would be similar, but perhaps less than those described for the Proposed Action Alternative.

4.35.4 No USACE Jurisdictional Wetlands Impacts Alternative

Under this alternative, there would be no environmental commitments similar to those described for the Proposed Action Alternative.

4.35.5 No Action Alternative

Under the No Action Alternative, IMC would not mine the Ona site and no environmental commitments would be made.

4.36 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.36.1 National Environmental Policy Act of 1969

Environmental information on the project has been compiled, and this draft EIS has been prepared. Once the EIS process is completed, the project will be in compliance with the NEPA.

4.36.2 Endangered Species Act of 1973

Informal consultation was initiated with USFWS as part of the AWG process described in Sections 1.4.3 and 2.1.1.1. A Biological Assessment was conducted in 1999. Formal consultation has not been initiated.

Consultation with the National Marine Fisheries Service (NMFS) is not required. This project was fully coordinated under the Endangered Species Act and is therefore, in full compliance with this Act.

4.36.3 Fish and Wildlife Coordination Act of 1958

This project has been coordinated with the USFWS, and is in full compliance with this Act. Since the proposed action is not a water resources project, a Coordination Act Report is not required.

4.36.4 National Historic Preservation Act of 1966

The NHPA of 1966 (Public Law 89-665) declared that historic properties significant to the Nation's heritage should be preserved. Archival research, field work, and consultation with the Florida SHPO have been conducted in accordance with the National Historic Preservation Act, as amended, the Archaeological and Historic Preservation Act, as amended, and EO 11593.

To determine if significant archaeological resources or historic structures exist on (or for historic structures, within the viewshed of) the Ona site, a series of surveys were performed beginning in 1975 and completed as recently as mid-2000. The SHPO has concurred that none of the historic structures identified on the site are eligible for listing on the NRHP. Therefore, no additional research is required (see SHPO letters in Appendix C).

Although several archaeological sites were identified during the conduct of the surveys, only two of these sites were considered eligible for listing in the NRHP. Site 8HR5 is an aboriginal site that has been scientifically mitigated (i.e., excavated) to the satisfaction of the SHPO (letter dated May 15, 2000, Appendix C) (PAR, 1982).

Site 8HR779 was identified and considered potentially eligible for listing in the NRHP (SAR, 1999). The SHPO concurred in their letter dated March 14, 2001, and therefore, additional research is required for this site. IMC proposes to conduct Phase II testing to determine the eligibility of site 8HR779 for listing in the NRHP. If the site were determined eligible, IMC would proceed with data recovery from this site to mitigate any impact and to obtain concurrence from the SHPO indicating that mining activities would not have an adverse effect. These activities and coordination under Section 106 of the NHPA would be completed prior to conducting any ground-disturbing activities in the area (IMC, 2002).

The Florida SHPO concluded "that the proposed project would have no effect on sites listed, or eligible for listing in the National Register of Historic Places, or otherwise of historical or archeological value". The letter from the SHPO is included as Appendix C. The project complies with each of these federal laws.

4.36.5 Clean Water Act of 1972

IMC has submitted an application to FDEP for a Section 401 water quality certification (File #0169281-001). Per correspondence from FDEP dated April 3, 2002, the data provided with the application, as well as the Conceptual Reclamation Plan application, has been deemed complete as of March 28, 2002.

In addition, IMC has submitted a revised 404(b) application to the USACE Jacksonville District. A copy of this application is included as Appendix A of this document. A public notice in the form of a Notice of Intent was published on August 14, 2001. A public hearing will be held in a manner, which satisfies the requirements of Section 404 of the Clean Water Act.

4.36.6 Clean Air Act of 1972

This project will be coordinated with USEPA as part of the draft EIS review process to ensure compliance with Section 309 of this Act. The review findings of the USEPA on the draft EIS will be published in the *Federal Register*. A brief statement of the review findings and how they were addressed will be described in the final EIS and published in the *Federal Register*.

4.36.7 Coastal Zone Management Act of 1972

A federal consistency determination in accordance with 15 CFR 930 Subpart C is being conducted as part of the draft EIS review process. State consistency review was performed during the coordination of the draft EIS and the determination as to whether the project is consistent with the Florida Coastal Zone Management Program will be provided in the final EIS document.

4.36.8 Farmland Protection Policy Act of 1981

The purpose of the FPPA is to minimize the extent to which the action taken by federal agencies contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. The NRCS is the agency primarily responsible for implementing the FPPA. If a federal action would result in the conversion of prime or unique farmland to a non-agricultural use, form AD-1006 is used to calculate the Farmland Conversion Impact Rating, and must be completed by the federal agency and submitted to NRCS.

As discussed in Section 3.8.2.2, there are no prime farmland soils in Hardee County (SCS, 1984; Richards, 2002). However, any land in Hardee County that is in citrus production is considered unique farmland (Richards, 2002). There are 209.2 acres at the Ona site that are currently in citrus production and would be converted to nonagricultural use under either action alternative.

To comply with the FPPA, a Farmland Conversion Impact Rating form (AD-1006) was completed in consultation with the NRCS (Henderson, 2002; Appendix C). A Land Evaluation/Site Assessment was used to determine the relative value of the 209.2 acres of citrus grove that would be converted under either of the action alternatives. The site was given a total value of 121 points out of a possible 260 points. The FPPA recommends that sites receiving scores of less than 160 points be given minimal levels of protection and no additional sites need to be evaluated. Therefore, the project complies with the FPPA.

4.36.9 Wild and Scenic River Act of 1968

No designated Wild and Scenic river reaches would be affected by project related activities. This Act is not applicable.

4.36.10 Marine Mammal Protection Act of 1972

The intermittent nature of the on-site streams at the Ona site eliminates the possibility of marine mammals being impacted by the project. Therefore, this Act is not applicable.

4.36.11 Estuary Protection Act of 1968

The Estuary Protection Act of 1968 (PL 90-454, 82 Stat 625, 16 USC 1221) was passed to provide a means for evaluating the nation's estuaries to achieve a reasonable balance between the need to protect their natural beauty and other resource values, and the need to develop them for further growth of the nation.

An adjunct to the Estuary Protection Act was the creation of the National Estuary Program (NEP) in 1987 through amendments to the Clean Water Act. The NEP was designed to identify, restore, and protect nationally significant estuaries of the US. The USEPA administers the NEP. However, committees consisting of local government officials, private citizens, and representatives from other federal agencies, academic institutions, industry, and estuary user-groups manage program decisions and activities. Estuaries are selected for inclusion in the NEP through a nomination process (USEPA, 2002a).

Charlotte Harbor was designated as part of the NEP on July 6, 1995. Located on the west coast of peninsular Florida, Charlotte Harbor is the second largest open water estuary in the state. The basins of the Peace, Myakka, and Caloosahatchee Rivers (nearly 4,500 square miles) feed freshwater into the coastal area. The Charlotte Harbor estuary and contiguous coastal waters serve as a home, feeding ground and/or nursery area for more then 270 species of resident, migrant, and commercial fishes of the Gulf of Mexico. Manatee, sea turtle, woodstork, and dolphin are also found in the estuary and its watershed. This estuarine system and its watershed are both directly and indirectly a vitally important economic asset to the Florida suncoast (USEPA, 2002b).

Problems facing the Charlotte Harbor NEP include hydrologic changes, degradation of water quality, the loss of fish and wildlife habitat, and land use change. The population within the watershed is projected to reach 1.7 million by the year 2010, a 337 percent increase since 1970. This rapid growth has already radically changed the character and ecology of river mouth and coastal waters. Mangroves have been removed or cut back, red tide events cause public health warnings, seagrass areas have declined or been damaged, and groundwater pumping has reached its maximum limit. Despite these impacts, the main body of Charlotte Harbor and its adjacent estuarine systems are in comparatively good condition (USEPA, 2002b).

The Ona site falls within the boundaries of the Charlotte Harbor NEP. The program has numerous partners including Hardee County, FDEP, SWFWMD, USACE, USFWS, USEPA Region 4, and others. The coordination with these agencies, relative to the proposed action, has been ongoing since early 1998 (see Section 6.0). Therefore, the project is in compliance with the Estuary Protection Act.

4.36.12 Federal Water Project Recreation Act

Since the project is not a water resources project, the Federal Water Project Recreation Act, (Public Law 89-72) as amended, does not apply.

4.36.13 Submerged Lands Act of 1953

Under this Act, submerged lands are defined as "lands beneath navigable waters," which includes:

1. All lands that are covered by nontidal waters that were navigable under the laws of the US at the time the state became a member of the Union;
2. All lands permanently or periodically covered by tidal waters up to but not above the line of mean high tide and seaward to a line three geographical miles distant from the coast line of each state; and,
3. All filled in, made, or reclaimed lands that formerly were lands beneath navigable waters, as defined above.

Horse Creek has been claimed under this Act. The joint USACE and FDEP permit application in Appendix A has been submitted for authorization to use sovereign submerged lands as well as for a Federal dredge and fill permit.

4.36.14 Coastal Barrier Resources Act (CBRA) and Coastal Barrier Improvement Act of 1990

The CBRA designates a protected network of coastal barriers, termed the Coastal Barrier Resources System (CBRS). Federal agencies are prohibited from providing direct or indirect federal funding of various projects that might support development in these areas.

There are no designated coastal barrier resources in the project area that would be affected by this project. These Acts are not applicable.

4.36.15 Rivers and Harbors Act of 1899

This Act prohibits the creation of any obstruction to the navigable capacity of any of the waters of the US without specific approval of the Chief Engineer of the USACE. The proposed project would not obstruct navigable waters of the US. This Act is not applicable.

4.36.16 Anadromous Fish Conservation Act

Fish habitat at the Ona site consists of ephemeral creeks, perennial streams, and wetlands. As discussed in Section 3.4, the fish community on the site is dominated by mosquitofish and least killifish. Larger predatory fish species, including some of recreational importance, are found in the lower reaches of the creeks where streamflow is more constant and water depths are greater. Species observed in these reaches include largemouth bass, sunfishes, and catfish. Anadromous fish species would not be affected by the proposed project.

4.36.17 Migratory Bird Treaty Act and Migratory Bird Conservation Act

The Migratory Bird Treaty Act implements various treaties and conventions between the US and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing or possessing migratory birds is unlawful. The Act makes it unlawful to ship, transport or carry from one state, territory or district to another, or through a foreign country, any bird, part, nest or egg that was captured, killed, taken, shipped, transported or carried contrary to the laws from where it was obtained; import from Canada any bird, part, nest or egg obtained contrary to the laws of the province from which it was obtained.

The Migratory Bird Conservation Act establishes a Commission to approve areas of land or water recommended by the Secretary of the Interior for acquisition as reservations for migratory birds.

Although migratory birds utilize the site at various times, the proposed action would not result in a violation of either of these acts. To avoid impacting migratory waterfowl nesting, pre-clearing pedestrian transect surveys would be conducted prior to clearing any forested

DRAFT

wetlands. Migratory winter species are also recorded. If pre-clearing surveys reveal active nesting, clearing activities would be restricted until the young have fledged and mining activities would be rescheduled accordingly. Clearing of any nests would require consultation with the FFWCC and a nest removal permit.

4.36.18 Magnuson-Stevens Fishery Conservation and Management Act/Fishery Conservation and Management Act of 1976

The purposes of these Acts are to conserve and manage the fishery resource off the US coasts as well as US anadromous species and Continental Shelf fishery resources; support the implementation and enforcement of international fishery agreements for the conservation and management of highly migratory species; promote domestic commercial and recreational fishing under sound conservation and management principles; provide for preparing and implementing fishery management plans to achieve and maintain the optimum yield of each fishery on a continuing basis; establish Regional Fishery Management Councils to protect fishery resources through preparation, monitoring, and revision of plans that allow for participation of states, fishing industry, consumer and environmental organizations; and to encourage the development of underutilized U.S. fisheries. Congress amended the Magnusen-Stevens Fishery Conservation and Management Act extensively when it passed the Sustainable Fisheries Act (SFA) in 1996. The SFA promotes the protection of essential fish habitat. Essential fish habitat is defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. Although Charlotte Harbor and the lower Peace River may be essential fish habitat, given the distance of the proposed project from these areas and the lack of significant adverse impacts to the Peace River or Charlotte Harbor from the project, the proposed project would have no adverse impact on essential fish habitat. Therefore, the proposed project is in compliance with this Act.

4.36.19 EO 11990, Protection of Wetlands

The purpose of EO 11990 is to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands". To meet these objectives, the EO requires federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. The EO applies to:

1. Acquisition, management, and disposition of federal lands and facilities construction and improvement projects which are undertaken, financed or assisted by federal agencies, and;

2. Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities.

This EO does not apply to the issuance by federal agencies of permits, licenses, or allocations to private parties for activities involving wetlands on non-federal property. Therefore, the proposed action is not regulated by this EO.

4.36.20 EO 11988, Floodplain Management

Executive Order 11988 requires federal agencies to avoid the adverse impacts associated with the occupancy and modification of floodplains and to avoid floodplain development whenever possible. Additionally, it requires federal agencies to strive to 1) reduce the risk of flood loss, 2) minimize the impact of floods on human health, safety, and welfare, and 3) preserve the natural beneficial value of floodplains. This EO applies to the following actions:

1. Acquiring, managing, and disposing of federal lands and facilities;
2. Providing federally-undertaken, financed, or assisted construction and improvements, and;
3. Conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities.

Although the proposed action is not a federal action nor is it on federal land, the project has been evaluated in accordance with this EO. IMC proposes to minimize impacts to floodplains by avoiding the significant natural streams and associated floodplains on the site. Secondary impacts of mining adjacent to these streams would be mitigated through the ditch and berm recharge system. Only portions of the agriculturally altered Oak Creek are proposed for mining, and would be reclaimed to a more diverse aquatic system of marshes and forested stream floodplain. Therefore, the project is in compliance with this EO.

4.36.21 EO 12898, Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* promotes and supports equitable environmental protection to people and communities, regardless of their race, ethnicity, or economic status. Under this EO, federal agencies are to consider the potential impacts of a proposed project on minority and low-income communities. Consistent with this EO, an environmental justice survey was conducted for the Ona site. This survey collected data for the State of Florida, Hardee County, individual Census Tracts and Block Groups included within and adjacent to the boundary of the proposed project (Focus Area). 1990 US Census statistical data was used to compare these areas since the data for the 2000 US Census was not available for all the levels that were needed for comparison.

DRAFT

As described in (see Section 3.12.5, Table 3.12-7), the percent of minority populations within the Focus Area was significantly lower than for the larger study area, as well as for Hardee County and the State of Florida. Additionally, the Focus Area had a slightly higher mean family income than both the county and the surrounding area, but was lower than the state average. However, for the area it was not below average. Therefore, there would be no disproportionate impact on minorities or low-income populations from the Ona Mine, and the project complies with EO 12898.

4.36.22 EO 13045 Protection of Children from Environmental Health Risks and from Safety Risks

Executive Order 13045 requires federal agencies to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children, and to ensure that the agencies policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. This should be done to the extent that is allowed by law and is appropriate, and should be consistent with the agency's mission.

With the exception of a catastrophic dam break, which is addressed in Section 4.17.1, the Proposed Action poses no disproportionate risk to children and is therefore in compliance with this EO.

4.36.23 EO 13089, Coral Reef Protection

As prescribed by EO 13089, all federal facilities whose actions may affect coral reef ecosystems must protect and enhance the conditions of the ecosystem and ensure that any of these actions will not degrade the conditions of the coral reef ecosystem.

This EO does not apply since the proposed action is not at a federal facility or in a coastal area.