

More Inconvenient Truths: Wildfires and Wetlands, *SWANCC* and *Rapanos*

Florida has experienced a number of catastrophic wildfires in recent years. As explained below, this is just one of many negative consequences stemming from the Corps' failure to adequately protect wetlands after SWANCC. Might Rapanos offer a solution?

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Last summer, catastrophic wildfires closed interstate highways throughout Florida and caused further Everglades destruction. What does the recent U.S. Supreme Court's split decision on Clean Water Act wetlands regulation in Michigan have to do with these events? Discovering the implications of *Rapanos v. United States* (126 S. Ct. 2208 [2006]) for Florida first requires consideration of the U.S. Army Corps of Engineers' interpretation of the Court's 2001 decision in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineer (SWANCC)* (531 U.S. 159 [2001]). That case contributed to extensive catastrophic wildfires and the destruction of Florida's forests and wetlands, including wetlands that should have been covered under the jurisdictional reach of CWA §404.

In *SWANCC*, an equally divided Court determined the Corps exceeded its statutory authority by asserting jurisdiction under the CWA over an abandoned sand and gravel pit in northern Illinois. Wetlands at issue in that case were in a mined pit and were described in the ruling as "isolated, non-navigable, intrastate waters." The Corps' basis for asserting jurisdiction was that the man-made pit provided habitat and food for migratory birds, as described under the 1986 migratory bird rule (51 Fed. Reg. 41217).

The Court ultimately held that the migratory bird rule provided an insufficient basis for asserting jurisdiction under the CWA and that the Corps therefore lacked jurisdiction over the waters at issue in that case—isolated, non-navigable, intrastate waters. After *SWANCC*, the Corps used flawed logic to conclude that Florida's natural depressional wetlands were "isolated" wetlands, lacking hydrologic or other connections to navigable waters. Prior to *SWANCC*, the Corps exerted CWA §404 jurisdiction over natural depressional wetlands in Florida on a case-by-case basis. Following *SWANCC*, the Corps ceased requiring applications, permits, and mitigation for the destruction of those wetlands.

Florida's natural depressional wetlands have historic surface-water connections to navigable waters. These wetlands also occur in relict sinkholes connected to the underlying regional karst aquifer

system and thereby to navigable waters (Bacchus 1998, 2000, 2006; Bacchus et al. 2003). The Corps' interpretation of *SWANCC*, therefore, has no scientific basis as it applies to Florida. That interpretation also led to dramatic changes in Florida's aquifer system and has contributed to destructive wildfires throughout the state.

Florida Wetlands

After the *SWANCC* ruling, the U.S. Fish and Wildlife Service (FWS) conducted a national evaluation of geographically isolated wetlands and their important functions as "waters" under the CWA definition. At all but one of their national study areas, more than 40% of the total wetlands were identified as geographically isolated. Two of the study areas were located in Florida and contained a total of 5,311 wetlands comprising approximately 25,548 hectares (63,870 acres). Notably, the geographically isolated wetlands at those Florida study areas constituted 74% and 89% of the total number of wetlands (see Table 1), among the greatest number of geographically isolated wetlands of all national study areas (Tiner et al. 2002). Yet all of those wetlands probably would be eliminated from CWA regulation under the Corps' post-*SWANCC* interpretation of CWA §404 jurisdiction.

More recently, a 2005 investigation of agency records by the *St. Petersburg Times* revealed that no regulatory agency knew "how many acres of Florida wetlands have been destroyed in the past 15 years" despite the Corps' mandate to evaluate the cumulative impacts of wetland losses with each permit it issues. The journalists learned the National Wetlands Inventory (NWI), a small federal agency tracking wetland losses nationwide, mapped Florida's wetlands 20 years ago. Only limited portions of several west coast counties in south Florida have been updated since that time. The journalists also found the Corps had approved more wetland-destruction permits and allowed a higher percentage of direct wetland destruction in Florida than it did nationally. Between 1999 and 2003, the Corps approved more than 12,000 wetland-destruction permits in Florida while rejecting only one (<http://www.sptimes.com/2005/webspecials05/wetlands/index.shtml>).

Because of the lack of agency data, the *Times* investigation compared satellite images taken in the late 1980s and 2003, combined with data from the NWI and a state agency, to quantify wetland loss. Results of the *Times*' comparison, released on May 22, 2005, revealed that "at least 84,000 acres of Florida's wetlands have disappeared" since President George H.W. Bush's "no net

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Study Area	Acreage in Study Area	Wetlands Acreage in Study Area	Percent of Total Wetlands Area	Number of Wetlands in Study Area	Percent of Total Number of Wetlands
Crystal Lake	164,297.3	29,720.4	44.6%	1,175	74.2%
Dade City	167,883.9	34,149.4	41.0%	4,136	88.9%

loss of wetlands” policy took effect in 1990. Although this area of recent wetlands loss is incomprehensibly large, it represents only the direct loss of wetlands in Florida for a 15-year period through 2003. Indirect and cumulative impacts of the Corps’ actions have resulted in a much greater, but unquantified, loss of wetlands in Florida (Bacchus 2000, 2005, 2006).

Hydroperiod Alterations in Florida

The regional Floridan aquifer system underlies both submerged and exposed portions of the carbonate platform, forming the southeastern coastal plain. The regional karst aquifer system extends throughout Florida and the coastal plain portions of Alabama, Georgia, and South Carolina. Groundwater from that regional karst aquifer system is pumped from wells for municipal, agricultural, and industrial uses. Groundwater mining (water removed by mechanical pumping) dewateres the shallow surficial aquifers where wetland and upland vegetation is rooted, thereby altering natural hydroperiods. Nonmechanical dewatering of the aquifer system also occurs in Florida from increased evaporative loss of groundwater when aquifer formations are removed (e.g., dredged mine pits) and from increased transpiration losses when native plant species are displaced by invasive alien species such as *Melaleuca quinquenervia* (*Melaleuca*). Both mechanical and nonmechanical dewatering have devastating impacts throughout Florida, including the triggering of destructive wildfires (Bacchus 2005, 2006).

The earliest and most thorough scientific studies documenting large-scale environmental impacts and economic ramifications of groundwater alterations in south Florida began in 1978, with preparation for Miami-Dade County’s new supply wells in south Florida. In May 1983, the new well field began withdrawing groundwater supporting the Everglades ecosystem. By 1988, species composition in the study area had shifted from desirable native wetland species to woody, upland plants dominated by the invasive alien tree *Melaleuca*, with a respective loss of both herbaceous and wetland species (Hofstetter and Sonenshein 1990; Sonenshein and Hofstetter 1990). The authors in those studies attributed the adverse environmental impacts to groundwater mining from the municipal well fields.

A 2000 article summarized the causal links between groundwater mining in Florida and more comprehensive adverse environmental impacts (Bacchus 2000). Those adverse impacts, described in state agency and legislative reports during the early 1990s, include:

- catastrophic wildfires;
- induced sinkhole activity and large-scale land-mass subsidence;
- lowered water levels and altered hydroperiods in wetlands, lakes, and streams;
- rapid and severe desiccation and oxidation of soils;
- loss of overstory trees and wildlife;
- complete loss of natural habitat; and
- other adverse environmental impacts.

More specifically, those 1990 reports concluded that approximately 6,880 hectares (17,000 acres) of wetlands had been destroyed by indirect and cumulative impacts of municipal groundwater mining in a single county. Approximately \$4 million had been spent repairing private wells damaged in that area by groundwater mining. Aquifer storage and recovery (ASR) and nonmechanical dewatering result in adverse environmental impacts similar to groundwater mining (Bacchus 2005, 2006).

Environmental damage comparable to that of groundwater mining has been attributed to regional aquifer system dewatering, by mechanical and nonmechanical means, from Florida’s mining industry. Limestone, sand, shell, and peat are mined for fertilizers, titanium products, construction materials, pet food supplements, and potting soil. The Corps’ failure to adequately consider the adverse impacts of mining in Florida was described in *Sierra Club v. Flowers* (No. 93-23427 [S.D. Fla. Mar. 22, 2006]). That case involved a mining permit the Corps issued to 10 private companies for direct destruction of thousands of hectares of Everglades wetlands in Miami-Dade County. The court remanded the permits, concluding that the Corps and FWS had “failed to carry out their duty to protect the federal wetlands and protected species.” The opinion provides detailed descriptions of unconsidered indirect and cumulative impacts to wetlands and the surrounding environment of mining. The plaintiff did not challenge the Corps’ determination of CWA §404 jurisdictional wetlands in that case, but provided subsequent testimony on unconsidered economic impacts.

Recently, four proposed and/or issued Corps mining permits, including the permit challenged in *Sierra Club v. Flowers*, were evaluated to determine their impact on Florida’s regional aquifer system. Nonmechanical dewatering at the excavated and proposed mine pits would result in approximately 237,016 cubic meters per day (62.7 million gallons per day) of induced discharge from the regional Floridan aquifer system. That volume exceeds the total reported pumpage from three supply wells in the Miami-Dade area (Bacchus 2006). Those supply wells and one of the above-referenced mining

projects are associated with post-SWANCC wildfires that destroyed Everglades wetlands and other sensitive natural areas. Ironically, aquifer injections and subsequent withdrawals from ASR wells are increasing throughout Florida, reportedly as a means of moderating harm from groundwater mining. In addition to these problems, and as noted above, *Melaleuca* invasion and spread results from natural hydroperiod alteration by groundwater withdrawals and dredging, particularly dredging associated with mine pits in south Florida. *Melaleuca* further dewateres natural wetlands and surrounding areas with naturally high water tables because it has a significantly higher transpiration rate than the native species it replaces. Therefore, *Melaleuca* can increase wetland and upland areas subjected to destructive wildfires even if mechanical dewatering of the aquifer system is halted (Bacchus 2006; Hofstetter and Sonenshein 1990; Sonenshein and Hofstetter 1990).

A 2004 university survey found public agencies spent approximately \$25 million from 1989 to 1999 attempting to control *Melaleuca* in south Florida. That expenditure—five times NWI’s average annual budget for 2000-2005 for mapping wetlands nationwide—achieved

no net reduction in the acreage covered by *Melaleuca*. During 2003, approximately 34,692 hectares (86,731 acres) of south Florida’s public and agricultural lands infested with *Melaleuca* were treated as a control measure, at a total cost of \$13.2 million. Public funds from meager park/preserve budgets represented about \$10.8 million, with an additional \$900,000 from the U.S. Agricultural Research Service’s “TAME *Melaleuca*” program. Those figures exclude expenditures by citizens attempting to control *Melaleuca* on private property. Old world climbing fern (*Lygodium*), another aggressive alien plant in south Florida, routinely invades and covers native vegetation where groundwater extractions occur. Of the invasive plants identified in the survey, *Lygodium* was the third most wide-spread. It covered 45,554 hectares (113,884 acres), with 19,685 hectares (49,213 acres), or 43% of the occupied area treated for control (Carter-Finn et al. 2006a, 2006b, 2006c, 2006d).

The university’s results did not reference the cause of *Melaleuca* invasion and spread or indicate survey participants were asked if they were aware of the cause. Results revealed *Melaleuca* was the invasive plant occupying the largest area in south Florida parks and preserves: 247,727 hectares (619,317 acres). It also represented the

largest area of invasive plants treated during 1990-2003: 160,835 hectares (402,088 acres). That extent constituted only 65% of the area currently occupied by *Melaleuca* in south Florida.

Catastrophic Wildfires in Florida

In 1998, approximately 100,000 people from Flagler County on Florida’s northeast coast were ordered to evacuate because of catastrophic wildfires. These wildfires began inland, near well fields supplying municipal water for Palm Coast and neighboring Daytona Beach in Volusia County. In addition to the

destruction of homes and silvicultural stands during these wildfires, direct economic impacts from the disruption of the annual NASCAR races was estimated to be in the millions of dollars. Destructive wildfires were rekindled in April 1999, resulting in Governor Jeb Bush requesting national disaster area status for 67 counties, qualifying them for federal assistance at the taxpayers’ expense. Cost estimates of wildfire damage reported by media did not address impaired human health, irreversible environmental damage, and loss of major interstate transportation

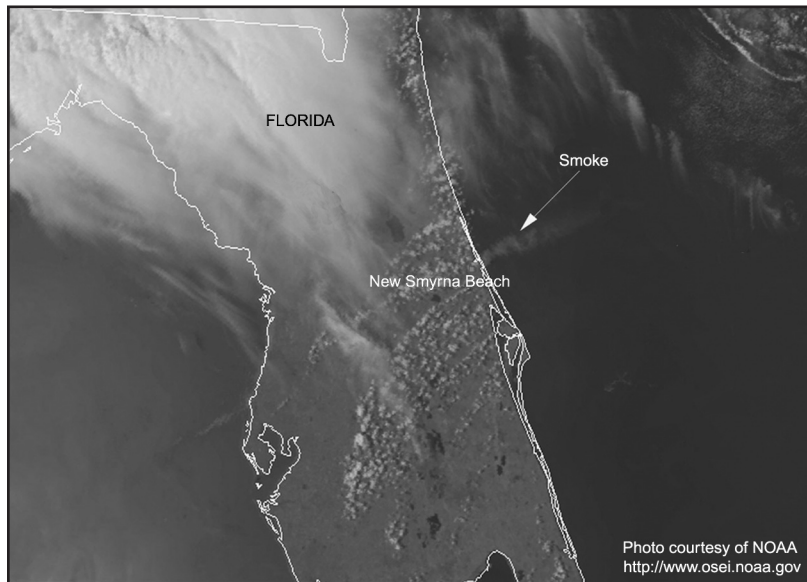


Figure 1. NOAA satellite image taken on May 7, 2006, depicting the location of a catastrophic Florida wildfire near New Smyrna Beach and its smoke plume, extending approximately 160 kilometers (100 miles) over the Atlantic Ocean.

corridors due to smoke (Bacchus 2000).

In May 2006, Florida experienced catastrophic wildfires originating near municipal well fields and excavated pits along Interstate 95 (I-95) in east-central Florida (Figure 1). The plume of smoke, equivalent to the state’s breadth and extending over the Atlantic Ocean, closed I-95, forcing evacuation of approximately 1,000 nearby homes. No media sources linked the 2006 or previous destructive wildfires to the dewatering of the regional aquifer system, despite the connection between groundwater mining and destructive wildfires established as early as 1990 (Bacchus 2000). Figures 2 and 3 depict environmental damage from those wildfires.

The 67 wildfires recorded by the Florida Division of Forestry in May 2006 included a destructive wildfire at the Tosohatchee State Reserve. The initial action triggering that wildfire began about 45 days earlier as an aerial-ignited prescribed burn at the Reserve. That fire continued smoldering in the densely forested natural hammock near Jim Creek, due to hydroperiod alterations related to indirect and cumulative impacts of the Corps’ actions. On May 5, 2006, the fire reignited as a destructive wildfire, burning approximately 260 to 280 hectares (650-700 acres) of sensitive natural forests in



Figure 2. This photo depicts charred remains of pond-cypress in a depressional wetland after the July 4, 1998, wildfire in Flagler County, Florida. As in figure 3, the light areas are *Chrysonilia*, the conidial state of the fungus *Neurospora*. Photo courtesy of S. Bacchus.



Figure 3. This photograph, also taken shortly after the July 4, 1998, wildfire in Flagler County, Florida, shows the charred remains of pond-cypress (background) and roots of other wetland trees in another depressional wetland. Photo courtesy of S. Bacchus.

the Reserve not intended for burning (Brantley 2006). Historically, natural wildfires were ignited by lightning and occurred frequently throughout Florida. Fires are essential for maintaining Florida's natural communities and reducing accumulated leaf litter. Hence, prescribed burns have been used as a management tool to mimic beneficial natural wildfires. Groundwater alterations and resulting hydroperiod alterations have changed the beneficial effects of natural and prescribed fires. Prolonged smoldering and re-ignition are characteristic where the natural hydroperiod is altered by mechanical and/or nonmechanical dewatering of the aquifer system. The artificially lowered water table allows normally saturated organic soils in wetlands and forested hammocks to subside, smolder, and ignite tree roots and trunks (Fig. 2 and 3).

Rather than informing the public that aquifer withdrawals and other forms of dewatering must be reduced to eliminate the cause of destructive wildfires, Florida simply provides its citizens with "firewise" recommendations encouraging use of concrete and cement products. Those products are made from raw materials mined from the aquifer system, further depleting exploited groundwater resources and increasing the probability of catastrophic destructive wildfires (<http://www.floridadisaster.org/bpr/EMTOOLS/wildfire/wildfire.htm>). A Wildfires Fact Sheet prepared by the Federal Emergency Management Agency requires mitigation. It defines "mitigation" as "activities that prevent an emergency, reduce the chance of an emergency happening, or lessen the damaging effects of unavoidable emergencies" (<http://www.floridadisaster.org/bpr/EMTOOLS/wildfire/wlfrls.pdf>). Reducing groundwater impacts and subsequent wetlands loss by preventing additional dewatering of the regional aquifer system fulfill FEMA's definition of mitigation of wildfire impacts. Conversely, agency-required compensatory mitigation has largely failed to replace wetland acreage or function (Turner et al. 2001), and wetland mitigation "banks" in Florida succumb to the same subsurface dewatering and destructive wildfires as natural wetlands permitted for destruction.

The Corps' "Regulation" of Wetlands

The destructive wildfires described above have increased in number and extent throughout Florida subsequent to *SWANCC*. The Corps' failure to consider the indirect or cumulative impacts of their actions in Florida--both before and after *SWANCC*--and its failure to regulate natural depressional wetlands pursuant to CWA §404, is compounded by failures in the wetlands permitting scheme.

The CWA requires the Corps to consider the adverse direct, indirect, and cumulative impacts of its decisions. Yet it has failed to consider the adverse indirect and cumulative impacts of hydroperiod alterations from groundwater pumping and dredged mine pits in Florida, including destructive wildfires and invasive alien species. The Corps' long-term failure to consider the impacts of its actions is a primary factor in the need to restore the Everglades. Ironically, one of the primary components of the Corps' \$10 billion Everglades "restoration" proposal is to dredge more and larger pits and to drill approximately 330 ASR wells throughout south Florida to inject contaminated water directly into the aquifer system (see Bacchus 2005 for adverse environmental impacts of ASR).

The Corps issues thousands of CWA §404 permits in south Florida that allow the majority of each project site to be converted to impervious surfaces. Impervious surfaces, such as parking lots and structures, prevent natural recharge of the aquifer system and significantly increase the large volumes of contaminated stormwater runoff. The other major CWA §404 permit action by the Corps is authorizing dredged pits, which further dewater the aquifer system. While it is true that the Corps is asserting jurisdiction over selected wetlands in Florida and regulating them, there are serious problems with that regulation. These failures in the permitting process exacerbate the problems stemming from the Corps' refusal to regulate other wetlands throughout Florida.

Typically, when a project site contains only natural depressional wetlands, those familiar with the Corps' *SWANCC* interpretation in Florida and its failure to enforce (a subject beyond the scope of this

Article) either destroy those wetlands without Corps communication or request a “determination letter.” The Corps responds with a “No Permit Required” (NPR) letter—implying there are no “wetlands” on the site. The NPR letter is then used to support state and local deferral on wetlands extent to the Corps. Notably, the Corps does not require information about the proposed project prior to issuing an NPR letter. Both approaches result in unregulated wetland destruction. Similar approaches are used to obtain a “general permit,” even when the area of depressional wetlands far exceeds the wetlands threshold authorized for general permits under CWA §404. Applicants frequently refer to natural tributaries as “ditches” as another means of obtaining general permits.

For projects I have reviewed, the Corps generally does not conduct site inspections prior to issuing NPR letters or general permits in Florida and no public notice is required. Prior to the destructive 2006 wildfire shown in Figure 1, the Corps issued NPR letters and general permits for projects in that immediate vicinity, including a major roadway for the new Venetian Bay subdivision and a proposed Super WalMart in New Smyrna Beach, and then a new high-density Ormond Grande development in Ormond Beach. The Corps also provided an NPR letter for Corkscrew Mine in the Everglades (described in Bacchus 2006). Examples of the no-permit approach for natural depressional wetlands in central Florida’s Sumter County include the Rinker Materials/Florida Crushed Stone Company’s Center Hill Mine (one of 10 companies at issue in *Sierra Club v. Flowers*) and piece-meal development in the “Rutland Ranch Subdivision,” containing extensive depressional wetlands.

In other situations, a site may have natural depressional wetlands in addition to “navigable” wetlands and, therefore, require an “individual permit” for dredging and filling. In those cases, the Corps must publish a public notice for the proposed project. Yet individual permits to destroy wetlands in navigable waters generally are issued without acknowledging that the natural depressional wetlands also are being destroyed. In addition, individual permits must provide “mitigation” for destroying acknowledged wetlands. Because the area of destroyed natural depressional wetlands is not acknowledged, even superficial “mitigation” is not required for that loss. The Corps routinely accepts permit conditions requiring establishment of “mitigation” wetlands within dredged mine pits and stormwater ponds as compensation for the direct destruction of the natural wetlands the Corps chooses to regulate. This practice converts Florida’s natural wetlands, intended for regulation under the CWA, into unregulated SWANCC pits.

While general and individual permits are issued for a single project on a single site, the Corps may also issue a “regional general permit” (RGP), allowing a multitude of projects to proceed in large areas containing expansive natural wetlands, further compounding problems in the permitting process. One such case is worthy of examination.

On June 30, 2004, the Corps issued an RGP for Florida’s panhandle, allowing the destruction of hundreds of hectares of natural depressional wetlands in an approximately 19,500-hectare (48,150-acre) area of Bay County. The RGP was challenged in *Sierra Club v. U.S. Army Corps of Engineers* (Nos. 3:05-cv-362-J-32TEM, 3:05-cv-459-J-32TEM [M.D. Fla. Nov. 19, 2006]). Intervenor St. Joe Company, Inc. (SJC) owns more than 75% of the land covered by that RGP, approximately 60% of which were reported as wetlands.

Yet the FWS and I confirmed the actual extent of wetlands in that RGP area is significantly greater. The majority of the area owned by SJC has been under silvicultural use (pine tree production). For normal silvicultural practices, wetlands are exempt from CWA §404 regulation. Ordinarily, the conversion from silvicultural use to development uses (as intended under the RGP) would remove that exemption. Because the RGP does not require a formal delineation of wetlands under established CWA procedures, it does not identify or include the full extent of natural depressional wetlands within the permitted area. Delineation will eventually take place on a case-by-case basis, just not before the RGP is issued, thereby resulting in a lack of public notice and comment and careful interagency review.

Of equal concern in this case was the establishment of “mitigation,” “conservation,” “preservation,” and “habitat restoration” areas. The general ineffectiveness of wetlands mitigation (Turner et al. 2001) is intensified in Florida, where even offsite mitigation banks are destroyed by the same indirect and cumulative impacts as on-site mitigation areas (e.g., hydroperiod alterations and destructive wildfires). More disturbing is the Corps’ acceptance of diverting municipal sewage effluent for discharge into an environmentally sensitive “conservation” area, a practice already deemed environmentally destructive in Florida’s panhandle. See *Teat v. City of Apalachicola*, No. 96-0031 (Fla. Cir. Ct. 1996). Another conservation area under the RGP would be converted to volleyball courts, making it difficult to justify the Corps’ determination that the RGP represents “good environmental policy.” Although the court issued a preliminary injunction in that case, it recently ruled in favor of the Corps, finding that the Corps’ actions were “at, but not beyond, the outer limits of the CWA.” As with *Sierra Club v. Flowers*, the plaintiffs did not challenge the Corps’ determination of wetlands extent.

The Corps’ decision not to exert jurisdiction over natural depressional wetlands or to consider the adverse indirect and cumulative impacts of those destroyed wetlands in Florida during the permitting process places the burden of wetlands regulation on the state. Ironically, the state’s position has been to maintain consistency with the Corps regarding what types of wetlands are regulated in Florida. For example, in two cases challenging proposed development activities within the Corps’ Bay County RGP area, the county has deferred to the Corps for regulation of wetlands. See *West Beaches Neighborhood Defense Fund, Inc. v. Bay County* (No. 06-1220 [Fla. DOAH, June 27-30, 2006]) and *Brown v. Bay County* (No. 06-0881 [Fla. DOAH, Aug. 16-18, 2006]), particularly the proposed recommended order in *Brown* and my testimony in both. Although no decision had been rendered in those state-level administrative hearings as of press time, the rulings will be “advisory” only, leaving state and local governments free to continue deferring regulation to the Corps.

In essence, the Corps’ SWANCC interpretation has been used as justification to cease requiring permits and mitigation for the direct destruction of natural depressional wetlands or considering the adverse impacts of their destruction in Florida. Any wetlands not destroyed directly by dredging and filling in Florida are converted into stormwater facilities or dumping areas for sewage effluent, or are otherwise destroyed by hydroperiod alterations and destructive wildfires resulting from adverse indirect and cumulative impacts.

Implications of *Rapanos v. United States*

While the impact of *Rapanos* awaits guidance from the Corps and the U.S. Environmental Protection Agency, as well as possible clarification by U.S. Congress, some interpretations suggest Justice Kennedy's opinion in the case sets forth the new test for determining jurisdiction over wetlands adjacent or connected to navigable waters (Murphy 2006). Florida's natural depressional wetlands "significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as 'navigable.'" Moreover, when considered cumulatively, the loss of those wetlands has caused and will continue to cause severe adverse impacts to Florida's watersheds as well as irreversible damage to the environment. Established in relict sinkholes, these wetlands exhibit groundwater connections to navigable waters and cannot be categorized as "ephemeral." They also exhibit ecological functions individually and collectively, influencing the integrity of downstream waters, consistent with Justice Kennedy's *Rapanos* decision. Hence, Florida's natural depressional wetlands clearly meet the jurisdictional test established by Justice Kennedy.

Justice Kennedy also supported implementation of region-wide regulations when wetlands in a region satisfy the requisite jurisdictional nexus. Florida's natural depressional wetlands are comparable to other natural depressional wetlands occurring throughout the southeastern coastal plain region, coinciding with the extent of the regional Floridan aquifer system and the ranges of numerous endangered and threatened species. That region has widely recognized, well-established ecophysiological boundaries coinciding with the extent of the regional Floridan aquifer system and are not subject to political definition, "gerrymandering," or "debate." The region includes all of Florida and the coastal plain portions of Alabama, Georgia, and South Carolina. A body of scientific literature already supports the determination for "region-wide categorical regulation" of those "comparable wetlands." That region also includes the ranges of numerous federally listed species equally reliant on those regional wetlands. Examples of key species with coincident ranges include the endangered wood stork (*Mycteria americana*) and the threatened eastern indigo snake (*Drymarchon corais couperi*). Adverse impacts from groundwater alterations, including destructive wildfires and invasive species, have been observed or predicted for all but two (Tropical Hardwood Hammock and Mangroves) of the 15 ecological community types required for the survival of federally listed species addressed in the South Florida Multi-Species Recovery Plan (FWS 1999). The combination of altered hydroperiods and destruction of critical habitat will nullify any efforts by the FWS for the continued survival of those species.

Consequently, Justice Kennedy's means of asserting CWA §404 jurisdiction over those natural depressional wetlands by "region-wide categorical regulation" throughout the southeastern coastal plain is justified. A "regional general permit," ignoring the presence of those wetlands, as in the Bay County RGP, does not meet Justice Kennedy's region-wide intent. It is unlikely that the Corps will exert region-wide jurisdiction over the natural depressional wetlands in the southeastern coastal plain without a suit challenging the agency's failure to regulate those wetlands or a clear congressional directive to the agency. *Rapanos* seems to provide an avenue for change.

Conclusion

The Corps' post-*SWANCC* exclusion of natural depressional wetlands from CWA §404 jurisdictional regulation has compounded environmental damage from unregulated indirect and cumulative impacts. Altered hydroperiods are one of the most devastating of those unregulated impacts. Alteration of natural hydroperiods result in catastrophic wildfires that destroy vast areas of wetlands and uplands, including "mitigation" and "preservation" areas. Left unchallenged, the Corps' failure to regulate natural depressional wetlands will result in the unmitigated loss of approximately 74-89% of Florida's natural wetlands, based on the results of FWS' wetland study released in 2002. In *Rapanos*, Justice Kennedy stated that "wetlands possess the requisite nexus, and thus come within the statutory phrase 'navigable waters' if the wetlands, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other waters more readily understood as 'navigable.'" Florida's natural depressional wetlands clearly meet that test. ■

—Acknowledgments

Florida Division of Forestry staff K. Cummins, S. McLellan, and M. Weinel and NOAA staff J. Simko and G. Stevens provided background information, graphics and images regarding Florida's May 2006 wildfires. State park ranger J. Brantley provided an eyewitness account of the circumstances leading to the *Tosohatchee State Reserve* wildfire and FWS Service staff J. Cooper provided historical information on NWI mapping. Critical comments from D. Ludder, J. Murphy, E. Robbins, S. Rubl, R. Weisskoff, and anonymous reviewers improved the manuscript.

REFERENCES

- Bacchus, S. T. 1998. Determining Sustainable Yield in the Southeastern Coastal Plain: A Need for New Approaches. pp. 503-519 in: J. Borchers and C. D. Elifrits (eds.) Current Research and Case Studies of Land Subsidence: Proceedings of the Joseph F. Poland Symposium.
- Bacchus, S. T. 2000. Uncalculated impacts of unsustainable aquifer yield including evidence of subsurface interbasin flow. *Journal of American Water Resources Association* 36(3):457-481.
- Bacchus, S. T. 2005. Adverse Environmental Impacts of Artificial Recharge Known As "Aquifer Storage and Recovery" (ASR) in Southern Florida: Implications for Everglades Restoration. Available at <http://www.thethirdplanet.org/downloads.html>
- Bacchus, S. T. 2006. Nonmechanical dewatering of the regional Floridan aquifer system. pp. 219-234 in: R. S. Harmon and C. Wicks (eds.) Perspectives on karst geomorphology, hydrology, and geochemistry—A tribute volume to Derek C. Ford and William B. White. Geological Society of America Special Paper 404.
- Bacchus, S. T., D. D. Archibald, G. A. Brook, K. O. Britton, B. L. Haines, S. L. Rathbun, and M. Madden. 2003. Near infrared spectroscopy of a hydroecological indicator: New tool for determining sustainable yield for Floridan aquifer system. *Hydrological Processes* 17:1785-1809.
- James Brantley, July 7, 2006, personal communication
- Carter-Finn, K., A. W. Hodges, D. J. Lee and M. T. Olexa. 2006a. The History and Economics of Melaleuca Management in South Florida. Available at <http://edis.ifas.ufl.edu/FE670>.
- Carter-Finn, K., A. W. Hodges, D. J. Lee and M. T. Olexa. 2006b. Management of Melaleuca by Professional Land Managers in South Florida. Available at <http://edis.ifas.ufl.edu/FE671>.

Carter-Finn, K., A. W. Hodges, D. J. Lee and M. T. Olexa. 2006c. Management of Melaleuca by Residents in South Florida. Available at <http://edis.ifas.ufl.edu/FE672>.

Carter-Finn, K., A. W. Hodges, D. J. Lee and M. T. Olexa. 2006d. Benefit-Cost Analysis of Melaleuca Management in South Florida. Available at <http://edis.ifas.ufl.edu/FE673>.

Endangered Species and Wetlands Report. 2006. Artificial water bodies credited with realizing "net gain" in wetlands. *Poplar Publishing*. March/April, 11(6,7):1-3.

Hofstetter, R. H. and R.S. Sonenshein. 1990. Vegetative Changes in a Wetland in the Vicinity of a Well Field, Dade County, Florida. U. S. Geological Survey Water-Resources Investigations Report 89-4155.

Murphy, J. 2006. Rapanos v. United States: Wading Through Murky Waters. *National Wetlands Newsletter* 28(5):1-19.

Sonenshein, R. S. and R.H. Hofstetter. 1990. Hydrologic Effects of Well-Field Operations in a Wetland, Dade County, Florida. U. S. Geological Survey Water-Resources Investigations Report 90-4143.

Tiner, R. W., H. C. Bergquist, G. P. DeAlessio, and M. J. Starr. 2002. Geographically Isolated Wetlands: A Preliminary Assessment of their Characteristics and Status in Selected Areas of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Northeast Region, Hadley, MA. Available at <http://wetlands.fws.gov/Pubs%5FReports/isolated/report.htm>

Turner, R.E., A. M. Redmond, and J.B. Zedler. 2001. Count it By Acre or Function--Mitigation Adds Up to Net Loss of Wetlands. *National Wetlands Newsletter* 23(6):5-16.

U.S. Fish and Wildlife Service. 1999. South Florida Multi-Species Recovery Plan. Atlanta, GA.

News

Scientists Recommend the Closure of MRGO

A coalition of scientists, in a report endorsed by several environmental groups, urged the closure of the Mississippi River Gulf Outlet (MRGO), a shipping channel constructed in the 1960s as a shipping shortcut between the Gulf of Mexico and New Orleans. U.S. Congress directed the U.S. Army Corps of Engineers to present it with a plan for closing MRGO (pronounced "Mr. Go") to oceangoing ships, and possibly to all water traffic. The scientists' report, *Mr. Go Must Go*, explains the problems caused by MRGO and sets forth recommendations for its closure. In all, the report said the channel has caused about 922 square miles of damage to the wetlands southeast of New Orleans. Scientists also say the channel acted as a conduit for Hurricane Katrina's storm surge. Today, the channel is routinely called a "hurricane superhighway." As of press time, the Corps had yet to submit its report to Congress.

Peatlands Destruction Drastically Impacts CO₂ Emissions

A recent study by Wetlands International and Delft Hydraulics reports that the draining and logging of peatlands in Indonesia has contributed to annual emissions of 2,000 million tonnes (Mt) of carbon dioxide, including 600 Mt from decomposition and 1,400 Mt from fires that can last for months. Indonesia emits 6.5 times as much CO₂ from degraded peatlands as it does by burning fossil fuels every year. In a ranking of countries based on their total CO₂ emissions, Indonesia comes 21st if peatland emissions are excluded. However, if peatland emissions are included, Indonesia is the third-largest CO₂ producer in the world, according to the study.

Bird, Once Thought Extinct, Rediscovered

Biologists for The Peregrine Fund (World Centre for Birds of Prey) recently discovered the Madagascar Pochard (*Aythya innotata*), a medium-sized diving duck that was considered extinct. National Director for The Peregrine Fund's Madagascar Project, Lily-Arison Rene de Roland, and field biologist, Thé Seing Sam, discovered the rare bird while conducting avian surveys in a remote part of northern Madagascar. The last confirmed sighting of the species was more than a decade and a half ago.

AWRA Conference on Water Resources

The American Water Resources Association will hold the Third National Water Resources Policy Dialogue in Arlington, Virginia, on January 22-23, 2007. The Dialogue will focus on three themes: Setting a Direction, Working Together Holistically, and Building on Science, with the aim of providing decision makers with guidance in the formulation and development of water resources policies attuned to societal needs and preferences. Each session includes presentations by speakers from the U.S. Congress, Cabinet Secretaries, as well as a governor. Presentations will be followed by small group facilitated discussions involving all attendees. Two panels of leaders of federal water resources agencies will present as well. For more information, visit the AWRA website at <http://www.awra.org>.

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