2020 Annual Report

Two new Science Committee members were nominated and unanimously elected by the WWALS Board:

* Dr. Burt Carter, Professor of Paleontology and Paleoecology at Georgia Southwestern State University in Americus, GA
* Dr. Don Thieme, Associate Professor of Geological Sciences at Valdosta State University in Valdosta, GA.

Continuing committee members included

* Dr. Can Denizman, Professor of Geosciences at Valdosta State University,
* John S. Quarterman, the WWALS President, and
* WWALS Board member Dr. Thomas Potter, Research Chemist (retired) USDA-Agricultural research Service. Dr. Potter serves as the committee chairman.

The Committee focused on providing a scientific basis for denial of a US Army Corps of Engineers (USACE) permit to Twin Pines Minerals (TPM) to develop a titanium mine within close proximity to the Okefenokee National Wildlife Refuge (OKNWR). The original permit application was made in July 2019. The source of the titanium and other minerals that the company plans to extract by strip mining are “heavy sands” deposits located in the Trail Ridge region that lies due east of the OKNWR eastern boundary. The proposed mine’s boundary is approximately 2 miles from the OKNWR. WWALS with support provided by the Committee submitted detailed written comments to the USACE during the initial comment period. These comments and other materials describing the proposed TPM project can be found at <http://wwals.net/issues/titanium-mining/>. In the face of enormous opposition (more than 60,000 comments) and a potential requirement to conduct a comprehensive Regional Environmental Impact Assessment (EIS), TPM withdrew their original application. However, the company subsequently submitted a slightly revised mining plan. The proposed area to be mined was only slightly smaller, only 15% less than the area in the original proposal. USACE set 12 April 2020 as a deadline for comment for this application. WWALS made a written request to extend the deadline and drafted a new comment letter and submitted it prior to the established deadline. Notably the deadline was extended. A virtual public meeting to discuss the new application was organized by USACE. Dr. Potter was able to register for and attend the meeting. He observed that it was dominated by presentations by TPM staff and their consultants with little opportunity for public comment or input. His related activities included participating in an on-line meeting/webinar organized by the Southeast Environmental Law center (SELC). The webinar focused on threats that the proposed mine presents to the OKNWR and water resources within the region. Participants heard several speakers including Dr. Todd Rasmussen, Professor of Hydrology, at the University of Georgia in Athens. Dr. Rasmussen and colleagues, provided a detailed critique of the hydrogeological basement of the mining project by TPM’s consultants. Many of their comments were included in WWALS April 12 letter to USACE. Dr. Potter also participated in an on-line course on applications of the USGS Model, MODFLOW that was organized by Dr. Rasmussen.

Other committee actives included consultation with the WWALS Testing Committee regarding interpretation of *E. coli* and other water quality measurements on samples collected within the Withlacoochee River watershed. This followed the intensive water quality monitoring program led by WWALS after the December 2019 sewage spill in Valdosta. In some cases very high *E. coli* levels were detected at the State Line Boat Ramp (GA 31) station and nearby locations, especially starting upstream at Knights Ferry Boat Ramp, which is downstream of where Okapilco Creek enters the Withlacoochee River. Water quality tests by Lowndes County, Valdosta, and WWALS, on Okapilco and other creeks in Brooks County seem to link the contamination, especially after rains, to animal agriculture.

This conclusion was supported by water quality tests performed by the Florida Department of Environmental Protection (FDEP). After repeated requests by WWALS, FDEP started publishing Florida results on its own website. Madison County Florida, Health Department continues to test weekly, sometimes twice, at GA 31, CR 150, and FL 6 on the Withlacoochee River. FDEP itself or the Suwannee River Water Management District (SRWMD) sometimes also sample at US 90 on the Suwannee River after reports of sewage spills or detection of bacterial contamination. FDEP samples monthly at several of those locations plus one on the Alapaha River.

After Valdosta’s raw sewage spill in early December 2019, the Florida agencies tested for bacterial contamination at approximately 4 day intervals from 12/20/19 to 1/20/20. FDEP also tested for chemical tracers (drugs and artificial sweeteners such as sucralose) and DNA markers (human, canine, ruminant, etc.), and selected pesticides. WWALS requested a copy of those results from FDEP and received them. FDEP Findings are summarized on the basis of “detections” i.e. when values were reported about the method detection limits.

 Only a single detection of the human waste DNA marker was reported. The measurement was near the limit of detection. A duplicate sample was also analyzed. In this case the biomarker was not detected. Thus finding that the human waste biomarker was present remains uncertain.

Ruminant DNA markers were by the far the most frequently detected, especially in late December and early January. This supports the WWALS conclusion that continuing episodes of bacterial contamination in the Withlacoochee River starting at Knights Ferry Boat Ramp are most likely the result of cow manure washing off pastures. It appears that bacterial contamination farther upstream could be related to runoff from horse pastures.

Chemical tracers detected which included drug residues and artificial sweeteners indicated the presence of sewage, most like treated sewage. The parameters sucralose, carbamzepine, and primidone were of particular note. Indeed sweetener sucralose was detected in all samples. Its link to treated waste is based on several published studies that indicate that levels in wastewater are not reduced (except by dilution) when sewage passes through wastewater treatment facilities. The presumed source is the City of Valdosta Withlacoochee Wastewater Treatment Plant (WWTP) which discharges into the river southwest of Valdosta. This is supported by the generally decreasing concentrations of these parameters at water quality stations from GA 31 (state line) to the Suwannee.

 Selected herbicides and insecticides were frequently detected, although in low concentrations. However among the insecticides detected were several in the neonicotinoid class. These compounds are highly toxic to selected invertebrates and to bees. Thus they may be having negative ecological impact. Further work is need to assess sources and potential ware quality threats.

Finally Committee members Thieme and Denizman provided support to the WWALS proposal for a Troupville River Camp. They provided a letter of support indicating that their students at VSU would likely benefit from the opportunity to map soils and study geologic features of the proposed site.

Table 1. Summary of FDEP water quality data: DNA and chemical indicators of sewage

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Marker type** | **detects** | **samples** | **% detects** |
| BacR-qPCR | Ruminant DNA | 28 | 69 | 41 |
| DG3-qPCR | Dog DNA | 0 | 69 | 0 |
| GFD-purified-qPCR | Bird DNA | 16 | 69 | 23 |
| GULL2-qPCR | Gull DNA | 0 | 69 | 0 |
| HF183-qPCR | Human DNA | 1 | 79 | 1 |
| Acesulfame K | sweetener | 2 | 79 | 3 |
| Acetaminophen | drug | 2 | 79 | 3 |
| Carbamazepine | drug | 63 | 79 | 80 |
| Hydrocodone | drug | 6 | 79 | 8 |
| Ibuprofen | drug | 2 | 79 | 3 |
| Naproxen | drug | 2 | 79 | 3 |
| Primidone | drug | 49 | 79 | 62 |
| Sucralose | sweetener | 79 | 79 | 100 |

Table 2. Summary of FDEP water quality data: selected pesticide residues

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Class** | **Compound** | **detects** | **samples** | **% detects** |
| Fungicide | Benzovindiflupyr | 0 | 79 | 0 |
| Fungicide | Mandestrobin | 0 | 79 | 0 |
| Fungicide | Pyraclostrobin | 0 | 79 | 0 |
| Herbicide | 2,4-D | 47 | 79 | 59 |
| Herbicide | Bentazon | 78 | 79 | 99 |
| Herbicide | Diuron | 39 | 79 | 49 |
| Herbicide | Endothall | 0 | 79 | 0 |
| Herbicide | Fenuron | 1 | 79 | 1 |
| Herbicide | Fluridone | 15 | 79 | 19 |
| Herbicide | Glufosinate | 0 | 79 | 0 |
| Herbicide  | Glyphosate | 9 | 79 | 11 |
| Herbicide | AMPA  | 34 | 79 | 43 |
| Herbicide | Imazapyr | 78 | 79 | 99 |
| Herbicide | Linuron | 0 | 79 | 0 |
| Herbicide | MCPP | 52 | 79 | 66 |
| Herbicide | Triclopyr | 0 | 79 | 0 |
| Insecticide | Acetamiprid | 12 | 79 | 15 |
| insecticide | Clothianidin | 12 | 79 | 15 |
| insecticide | Dinotefuran | 78 | 79 | 99 |
| insecticide | Imidacloprid | 76 | 79 | 96 |
| insecticide | Thiamethoxam | 42 | 79 | 53 |
| Insecticide | Afidopyropen | 0 | 79 | 0 |
| insecticide | Tolfenpyrad | 0 | 79 | 0 |