

Summary of Tracer Deployment at Brunswick January 26-February 6, 2003

Prepared By Trap Puckette

Personnel on site:

Trap Puckette – EHI
Jonathon Marsh – ETS
Kevin Black – ETS
Bob Ridgeway – ETS
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Purpose:

Deploy sediment tracer at Site C and the Jekyll Nearshore site.

Jan 26, 2003 Collection of sediment for mixing with tracer.

Seatow mobilized the barge with the crane around 5 am from the Mayors Point terminal in Brunswick and headed for Site C. I arrived in Brunswick at 8:30 and met Seatow personnel at St. Simons dock. At 0900 we left to meet the barge which was already on station.

At 0930 met the barge at site C (Photograph 1). Seas calm with a slight swell running. Tide was low and flooding. I got on the barge and we moved into position on the western side of site C. We were not able to go exactly where we had originally intended because of breaking waves so we went slightly to the north. The Seatow boat came alongside and held the barge in position. The crane began taking grabs with its bucket (3/4 cy; Photographs 2 & 3). Once the crane had a grab, it picked it up slowly and placed it into the container on the deck. Grab material varied from sandy silt to coarse sand. The crane took approximately 10 -12 grabs as we slowly drifted to the west with the incoming tide. As we collected the samples we took a series of navigation fixes with the Seatow DGPS. The locations are in Table 1.

Table 1

Site ID	lat	long
Mixing Sand 1	31°04.465	81°18.890
Mixing Sand 2	31°04.484	81°18.874
Mixing Sand 3	31°04.446	81°18.900

In total, approximately 7 cy of material was collected. The material was primarily a silty sand (photograph 4). Sampling was completed at 10:30. The barge then headed back to Mayors Point Terminal. I rode other Seatow boat back to dock. The barge arrived back at dock at around 1330.

I drained standing water off the top of the sediment once the barge was back at the dock. It was decided to stop work for the day and resume in the morning.



1 Barge used to collect sediment for mixing with tracer



2 Collecting sediment from site C to mix with tracer



3 Grab Bucket with mixing sediment



4 Sediment from site C to be mixed with tracer

Jan 27, 2003 Offloading sediment for mixing with tracer.

I went to Mayors point terminal at 0800 and met two laborers from the barge company. The sediment was well drained, but still moist. We began offloading the sediment into 10 gallon containers using shovels (Photograph 5). As we shoveled the material we tried to mix the sediments in a given layer with the intent being to get a homogenous mixture of silty sand. Pockets of coarse sand were mixed in with the finer grain material as best as possible. Once the material was in the containers, I added approximately 1 gallon of seawater and then put a lid on the container. The seawater was from water that had drained off the sediments and been captured in buckets. Once filled, the containers weighed approximately 100-110 lbs. We filled 100 in total (Photograph 6). Once the containers were filled we transported them over to the Seatow office and stacked them outside. There was approximately 3-4 cy of material left in the container that was not used. I told them to leave the material in the container and that we would shovel it off when we did the deployment at site C.

Andy arrived in the afternoon and prepared for the instrument cleaning that was also occurring that week. He checked out the LISST and also got the cassette for CC setup and running.



5 Sediment was shoveled into 10 gallon containers (~110 lbs)



6 Filling up the 10 gallon container (100 total)

Jan 28, 2003 Picking up first load of tracer from Customs.

I drove up to Savannah and met Bob Ridgeway from ETS at his hotel. His flight had been delayed and he arrived into Savannah too late to drive to Brunswick. We drove to the airport and checked on the shipment of first load of tracer. It had arrived but we had to wait several hours for the paperwork. We went to Home depot and picked up some supplies. By 1130 the paperwork arrived and we went and cleared the tracer through customs and then picked up the tracer from the airport terminal. We departed for Brunswick around 1300 and arrived at Brunswick at 1430.

Ray had arrived in preparation for the instrument cleaning. He was getting his stuff ready and helped us some. We went to unload the tracer and were planning to unload the bags by hand from the boxes (Photographs 7,8, & 9). However, we realized this was probably not a good way to proceed and decided to go ahead and rent a forklift. The forklift arrived and we unloaded the pallets. I went and bought some supplies including a large mixing tub. I loaded the cassette for CC in my truck along with LISSTs.



7) Box containing bags of tracer



8) 20 Kilo bags of tracer in box



9) 20 Kilo bags of tracer in box

Jon and Kevin arrived in Savannah around 0830 and Bob picked them up. I met with them at the hotel lobby at 1000 to discuss the plans for the following day.

Jan 29, 2003 Mixing first load of tracer

Met Ray and divers at marina at 0630 and gave them the cassette for CC and the LISST 100 and LISST 25X. They departed to install the instruments. I met ETS personnel at Seatow and we began to get setup for mixing the tracer with the recently acquired sediments. I ran around some getting additional supplies. Ray returned with the LISST-25 (SN 111) from CS and I proceeded to download the data and set it up to redeploy. Had some minor problems with the communications but resolved those. Returned LISST to Ray and he went to re-install at JN.

At 1230, Jon, Kevin, and I went to the Seatow dock and rode out to site C in Seatow boat at low tide to get a feel for where to deploy. Looked at site C and also JN. Returned to dock at 1345.

Went back to Seatow office and began to mix the tracer and sediments. For the Jekyll site we were going to mix in total 1000 kg of Magenta-sand (150-250 μm) and 500kg UV-blue-silt tracer (<100 μm).

Mixing was not going very well and found that the hand mixing was very slow (Photograph 10). I went to rental store and got drill mixers as well as an electric mortar mixer (Photographs 11 and 12). These seemed to help. We mixed the material in a ratio of 1 part silt tracer, 2 parts sand tracer, and 3 parts sediment then added enough water to get it to mix. By 1900 we had mixed about 1/3 of the tracer and decided to stop for the evening.



10) Mixing tracer and sediment by hand



11) Electric mortar mixer



12) Drill powered drywall mixer

Jan 30, 2003 Mixing first load of tracer (continued)

Continued mixing tracer. I rented a gas-powered mortar mixer which worked well (Photograph 13). We found that after the mixed sediment sat for awhile, water formed on the surface (Photograph 14). This water had to be “mopped off” with a sponge to prevent spillage (Photograph 15). At the end of the day we loaded the truck with as many containers as possible and had the others ready to go.



13) Gas-powered mortar mixer



14) Sediment/tracer mixture after initial mixing – standing water starting to form – additional mixing and sponging required



15) Sponging off the standing water

Jan 31, 2003 Deploying tracer at Jekyll Nearshore (continued)

The second load of tracer was supposed to arrive in Savannah today, but it did not. Bad weather in London had delayed the shipment.

For deploying the tracer we had decided to go with a 30X60 foot deck barge with a 20 foot container placed at one end (Photograph 16). All of the bag loading would take place in the end of the container to avoid getting any spray or rain on the bags during deployment. The plan was to load the barge during high tide and then head to the Jekyll Nearshore site. We had the barge loaded by 0930, but there was heavy fog and Seatow felt it was not safe to proceed until the fog lifted. By 1100, the fog had lifted enough to proceed and we got underway by 1130. I rode the barge out and set up the ADCP on the barge for recording currents during the deployment (Photograph 17). I could not get Winriver to connect with the GPS, so the data does not have GPS data. It appears that there was a port conflict.



16) Deck barge with the 20-foot container



17) ADCP mounted off the side of the barge.

Arrived at JN at 1300. Seas were calm with a light wind. Fog had returned and there was a lot of moisture in the air. ETS personnel arrived at approximately 1315 and we proceeded to deploy the Hydrocamel from the barge (Photograph 18).

The HydroCamel™ is a commercially manufactured submersible water sampler. The instrument can be programmed to take up to 20 [1 liter](#) seawater samples. In addition, the instrument will record turbidity (using a Seapoint™ optical backscatter sensor) and pressure. The user may prescribe the sampling frequency of these sensors. In this study data were collected in 10-second bursts at 5-minute intervals. The burst data were averaged and a single output value stored in the instrument memory. A turbidity threshold trigger can be set so that water samples are obtained when the ambient turbidity exceeds a prescribed value. The threshold must be exceeded for 12 consecutive 10 s burst periods (i.e. 12*5 min intervals=1 hour), before a water sample is taken. If the threshold turbidity trigger is not achieved, then a time-out sample is automatically taken every 24 hours. (Hydrocamel description provided by ETS)

By the time we were on station tide was about dead low and water depths at the site were 4 feet or less. The Hydrocamel frame is 3 feet, so we had trouble deploying it and not “running it over” with the barge. We finally got it placed and moved off to the west slightly for the tracer deployment. We anchored up on two anchors so that the barge sat North- South. The wind was out of the north and the tidal currents were weak so this was the best way to anchor. We ended up west of the gage sites by about 300

feet. We had intended to be closer, but I was concerned that with the shallow water depths we could easily damage the instruments if we drifted into them so I wanted to make sure we were sufficiently far away.



18) Hydrocamel in its frame

At 1400 we set up for the tracer deployment and did two trial runs with sediment only in the bags. The process was to dump 1 container of material into the trays we had constructed (Photographs 19 & 20). The sediments had dewatered and consolidated by this time so while they were still moist, they did not have free water associated with them. Once in the trays, it was necessary to break up the lumps of sediment/tracer mixture by hand (Photographs 21 & 22). After it was broken up, a bag was placed under the funnel at one end of the tray (Photograph 23) and the mixture was pushed into the funnel. The mixture fell into the funnel and filled up the bag (Photograph 24). Once the bag was full, it was laid on its side and a heat gun was used to seal the bag (Photograph 25). The bag was then handed to the “bag deployer” standing on a platform on the end of the barge. He would then gently place the bag in the water and let it go (Photograph 26). Once in the water, the bags lasted approximately 30-60 seconds. A typical bag weighed 10 to 15 kilos.



19 Setting up for deployment – 20 ft container mounted on barge



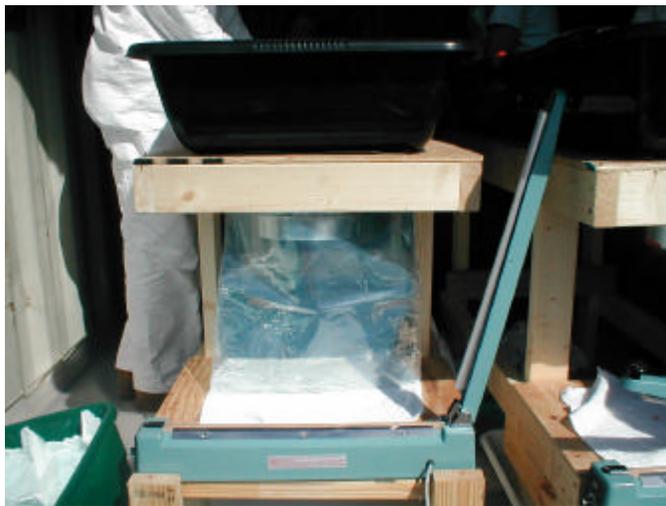
20) Pouring sediment/tracer mixture into trays used to fill dissolving bags



21) Breaking up the sediment/tracer mixture before putting into bags



22) Breaking up the mixture



23) Bag placed underneath the funnel



24) Mixture going into the dissolving bags



25) Sealing the bags with heat sealer



26) Placing the bags in the water

As we deployed the bags, the barge was moved forward on the anchor lines every 20 bags. This helped prevent accumulation of the bags in one area. We deployed a total of 219 bags. A DGPS position was recorded on the Seatow boat tied to the bow of the barge every time we moved. The recorded positions are provided in the Table 2 (See Map 1 at the end).
Table 2

Waypoint	Lat	Long
29	31°06.338	81°22.656
30	31°06.339	81°22.657
31	31°06.338	81°22.652
32	31°06.341	81°22.655
33	31°06.344	81°22.656
34	31°06.347	81°22.655
35	31°06.348	81°22.654
36	31°06.349	81°22.652
37	31°06.348	81°22.648
38	31°06.351	81°22.645
39	31°06.349	81°22.644
40	31°06.349	81°22.642

Generally the bags worked well, though we did have about 5 bags that split during filling and 1 bag that split as it was being handed down for deployment.

The ADCP had recorded current data during the entire deployment. Due to the shallow water depths, the ADCP data was very spiky. Also, the compass was biased by the steel hull of the barge.

We finished the tracer deployment at approximately 1900 and the barge headed back in. Myself and the ETS group rode a Seatow boat back in and got dinner and then met the barge back at the pier at 2300 to cleanup and secure items. We completed that by 2345.

Feb 1, 2003 Sampling for initial dispersion)

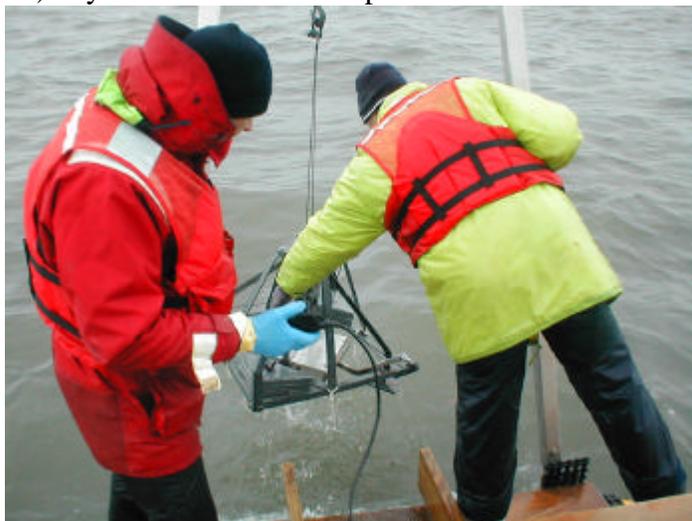
The second batch of tracer had not arrived and was not to arrive until Monday. It was decided to go ahead and grab sample around the Jekyll site and move the Hydrocamel. Kevin and Bob went in a Seatow boat and retrieved the Hydrocamel (Photograph 27 & 28) and then took the grab samples with the Smith-Mac (Photographs 29, 30 & 31). See the ETS report for sample locations of the T₀ sample event. Jon and I cleaned up at Seatow and returned the mortar mixer. Jon went and purchased more supplies. Since there was not much to be done until the tracer arrived, I departed for Charleston at 1300.



27) Retrieving the Hydrocamel



28) Hydrocamel with the top off



29) Deploying the Smith-Mac



30) Smith-Mac on deck with the lid open and ready to be sampled



31) Sample from grab sampler being “trimmed” so that only top inch is sampled

Feb 2, 2003

Hydrocamel redeploy

Bob and Kevin worked on the Hydrocamel and set it up to redeploy. It had not collected samples the first deployment because a sampling parameter had been entered incorrectly. By the afternoon they resolved the problems and redeployed it.

I was still in Charleston.

Feb 3, 2003

Awaiting the second set of tracer

I left Charleston around 10:15 and headed for Savannah to meet Bob at the airport and pick up tracer. We were waiting on 2 boxes of tracer. Box 1 contained all of the silt and about 1/3 of the sand. It had been held up in custom in Atlanta and ETS had worked with a freight forwarder to have the box shipped directly to Seatow. Box 2 contained the rest of the sand

and it had been held up in shipping but was supposed to arrive in Savannah Monday.

I met Bob at 12:15 and Box 2 had not arrived. Over the next several hours we spoke to several different people and finally confirmed it would not arrive until Tuesday. We returned to Brunswick and awaited the arrival of Box 1.

Andy arrived at 1400. He had come to help with tracer deployment and grab sampling. We set up for mixing and rented a concrete mixer instead of a mortar mixer. The Tracer arrived at approximately 1700 and we decide to go ahead and mix as much as we could. We were able to mix approximately 1/3 of the material with the amount of tracer we had.

Feb 4, 2003 Awaiting the second set of tracer

Left Brunswick at 0730 and headed back to Savannah. The tracer had arrived and we were able to pick it up at 0900. After loading up we headed back to Brunswick and arrived there at 1100. We went ahead and had lunch and started mixing at 1300.

For Site C we had violet-sand and yellow-silt tracer (of the same quantities and size fraction as per the Jekyll site). We finished mixing around 1900 and transported boxes over to the barge and loaded the barge. Finished loading the barge at 2000.

Feb 5, 2003 Deploying tracer at Site C

Barge left Mayors Point Terminal at 0600. Andy, Jon, Kevin, Rob and myself met the barge at 0915 at Site C. It was already anchored up on station. We rechecked the location and ran a couple of survey lines to make sure we were on top of the shoal. The barge was on 2 anchors and was sitting with a N-S orientation. Andy set up the ADCP on the port side of the barge.

Started to deploy tracer at 1000. Tide was flooding slightly, seas were initially choppy, but laid down by the time we started to deploy. Skies were clear and the temperature was in the upper 50s. Tide was high at 1045 and then slack for about an hour and then started to ebb.

The deployment went very smoothly with only a few bag splits. We had the same process of deploying 20 bags and then shifting the barge on the anchors. The coordinates of the bag drop locations are provided in Table 3 (See also Map 2 at the end).

Table 3

Waypoints	Lat	Long
60	31°04.252	81°18.791
61	31°04.250	81°18.789
62	31°04.248	81°18.791
63	31°04.248	81°18.793
64	31°04.248	81°18.790
65	31°04.246	81°18.788
66	31°04.244	81°18.789
67	31°04.244	81°18.787
68	31°04.242	81°18.786
69	31°04.241	81°18.786
70	31°04.241	81°18.788

The ADCP ran during the whole deployment, but unfortunately, no data was recorded for the first hour or so because the data record option had inadvertently not been selected.

We finished the deployment at 1420 and deployed a total of 181 bags. We headed back to shore. During the first part of the trip in we ran some test on the ADCP to determine the compass offset due to the steel hull of the barge.

We then got off the barge and rode one of the Seatow boats back to the dock. We met the barge back at Mayors Point Terminal at 1800 and cleaned up. Completed cleanup by 1630 and then returned to the Seatow office where we finished the cleanup there by 2000.

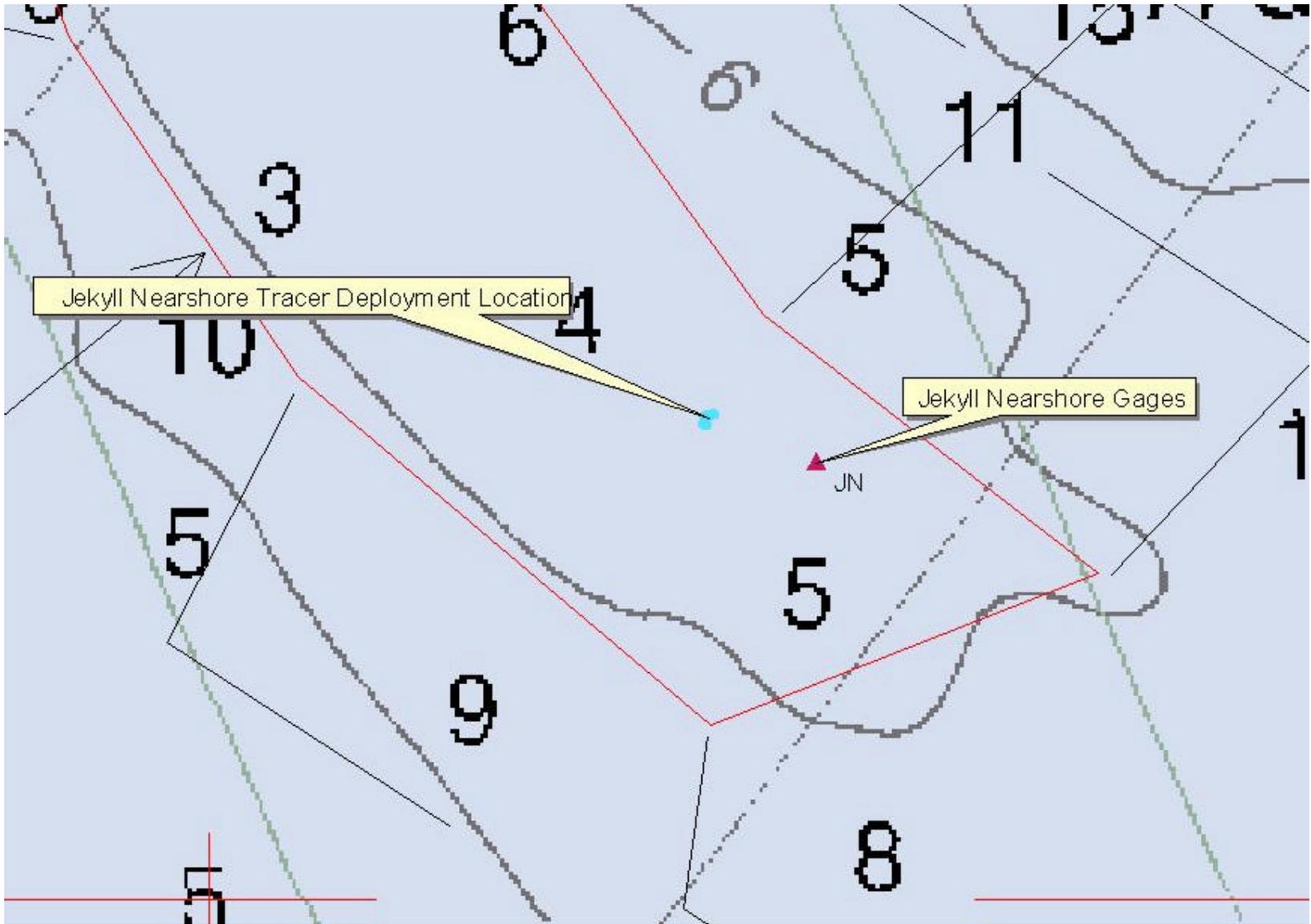
Feb 6, 2003 Post-deployment sampling at Site C

Andy, Kevin, and Bob put the A-frame on the Seatow boat and went to retrieve and redeploy the Hydrocamel and take grab samples at Site C. They were able to retrieve the Hydrocamel, but it was too rough to redeploy or sample.

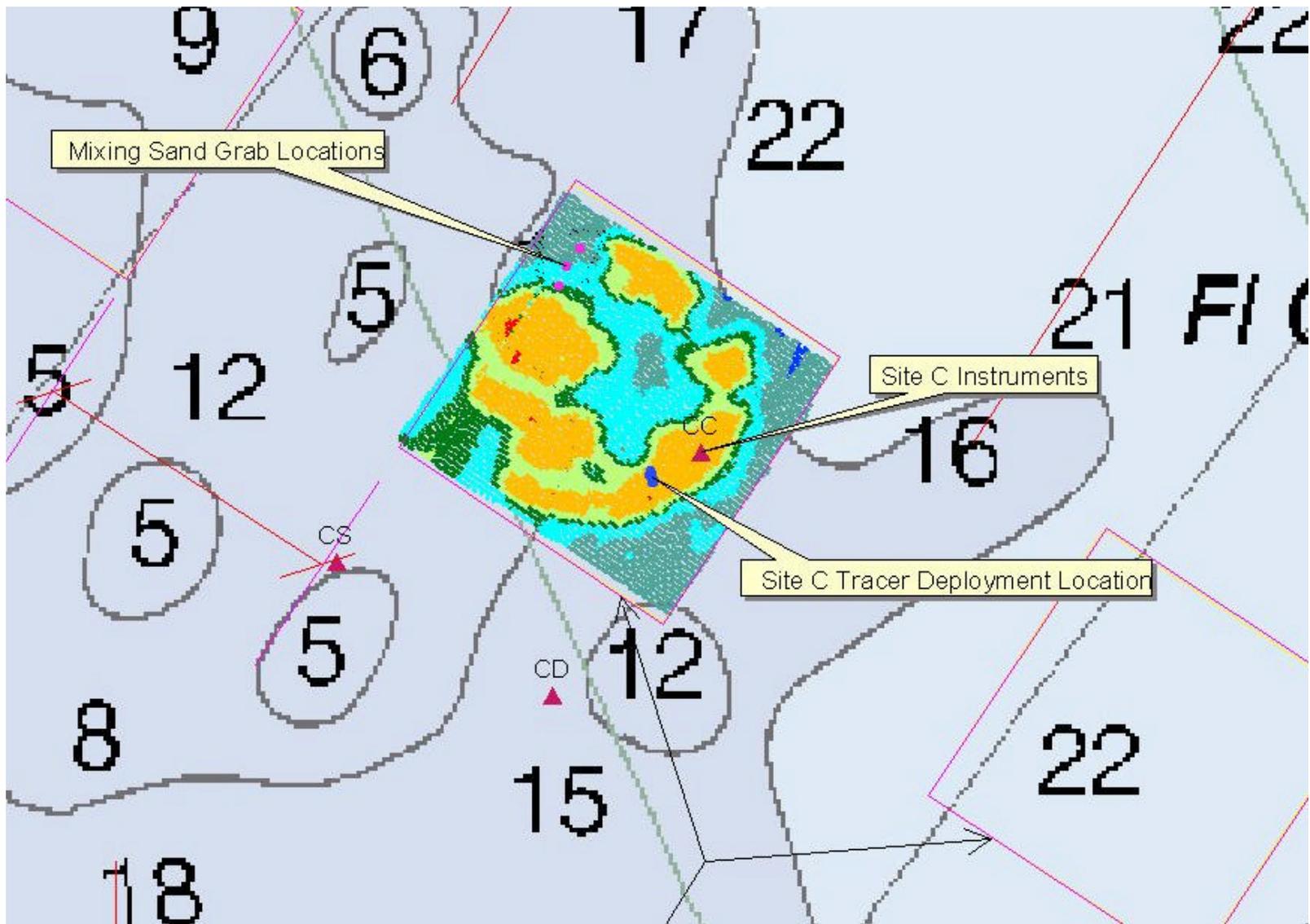
Jon and I returned the rental equipment and finished some minor cleaning around Seatow and then left. I dropped Jon at the Savannah Airport at 1130 and then continued to Charleston. Arrived in Charleston at 1400.

Feb 7, 2003 Post-deployment sampling at Site C

Andy, Kevin, and Bob collected post-deployment grab samples at Site C and redeployed the Hydrocamel. See the ETS report for sample locations of the T₀ sample event.



MAP 1: Tracer Deployment Locations at the Jekyll Nearshore Site



MAP 2: Tracer Deployment Location at Site C