Tillamook Estuaries Partnership
A National Estuary Project

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November 30, 2012

Tom Shafer
13408 East Alsea Highway
Tidewater, Oregon 97390

Dear Tom,

This correspondence serves as Tillamook Estuaries Partnership's (TEP) first interim effectiveness monitoring report for the Miami Wetlands Effectiveness Monitoring grant (OWEB Grant No. 211-1012-8406). It meets requirements for interim monitoring reports established in Exhibit B, Section 3(b) of our OWEB grant agreement. Specifically, this document responds to paragraphs 1-4 in Exhibit C of the original grant agreement.

Construction efforts at the site began during summer 2010 and were concluded during summer 2011. Planting of native trees, shrubs and herbaceous wetland plants began in spring 2011. Areas that we were unable to plant due to ongoing construction activities were planted during spring 2012. Additional areas of the property (predominantly outside of the wetland construction zone) are to be planted during spring 2013. Additional plantings in previously planted zones (to increase densities and replace mortalities) also are planned for spring 2013. Clearing of undesirable vegetation surrounding planted specimens) began during summer 2011 and will continue through at least summer 2015.

We reported baseline conditions at the Miami Wetlands site (the site) in a November 2011 document (Bailey 2011 – included as an electronic attachment to this letter report). The information provided in this letter report builds on data collection efforts conducted for the 2011 report. We have collected a considerable amount of data at the site and are still in the process of analyzing this information. This information will be incorporated into a larger, more formal report at a later date, but at this time we are providing information required by our grant agreement in this abbreviated and less formal format. For example, this report does not include a full Methods section describing protocols used to collect and analyze monitoring data. Instead we reference applicable sections in the 2011 report where this information is provided in full. The sections on the following pages quote paragraphs 1-4 of Exhibit C and provide responses to these reporting requirements.

Thank you for your support of the Miami Wetlands Restoration Project and this monitoring effort. If you have any questions or require additional information, please do not hesitate to contact me or Rachel Hagerty.

Sincerely,

Scott Jay Bailey
Project Manager

1. **Summary of Monitoring that was completed including:**

A. Protocols used

We are monitoring a variety of physical and biological attributes at the site (Physical attributes = water elevation, water quality, soils, and channel cross sections. Biological attributes = vegetation, macroinvertebrates, secretive marsh birds, and fishes). Methods used to collect and analyze these data are described fully in Sections 2.1 and 2.2 of the 2011 report (pages 10-29)[1]. Unless otherwise noted, methods followed to collect and analyze post-construction data presented below do not differ from those described in the baseline report.

We have completed the following monitoring activities since construction activities ended in summer 2011:

1. Vegetation Monitoring
    a. line-intercept transects (spring 2012),
    b. $1m^2$ herbaceous plots (spring 2012),
    c. 5m radius tree/shrub plots (spring 2012), and
    d. restoration planting survival monitoring (fall 2011 and 2012)
2. Channel Cross Sections
    -Hobson-Struby creeks channel and tidal channels (fall 2012)
3. Snorkel survey for juvenile fishes
    -Hobson-Struby creeks and tidal channels (spring 2012)
4. Water elevation monitoring with data loggers at eight well sites
    -Continuous and ongoing
5. Water quality monitoring with data loggers at stations in the Hobson-Struby creeks channel and tidal channels north of the river
    -Several two week intervals (summer 2012)
6. Marsh bird survey
    -Spring 2012

The following sections elaborate on data collection protocols not reported on in the 2011 document.

Restoration Planting Survival Monitoring. Our post-project monitoring efforts include a specific effort to monitor the survival of our wetland restoration and riparian restoration plantings. Wetland plantings have occurred on approximately 23 acres in interior portions of the site and riparian plantings on approximately 10.5 acres along both banks of the Miami River. This monitoring is needed to track our revegetation efforts and determine if and where replanting efforts may be needed and which species may need replanted due to unacceptable survival rates. Because the 2011 document reported pre-construction baseline conditions, it does not describe the protocols that we are using for this effort.

Within the approximately 23 acres of wetland planting zones we have planted thousands of native trees, shrubs and herbaceous wetland plants and, as a result, it is not possible to track the fate of each individual plant used for the replanting effort. Therefore, we used 0.1 acre circular plots (37.2 ft radius) to sample these restoration planting zones and estimate survival rates for each species. Because only tree and shrub species were used in the approximately 10.5 acres of riparian planting zones, we have been able to conduct a complete census of these areas to track the survival of these plantings.

Like most other monitoring efforts at the site, we are primarily sampling the wetland planting zones along the permanent monitoring transects we established during baseline data collection efforts. Sample plot locations along each transect were randomly selected before beginning field work. During each annual sampling effort we used a random number generator to select the distance of each plot center point from transect starting points (transects north of the river run from west to east and transects south of the river run from south to north). While in the field, we navigated to each of these points and assessed the status of all planted specimens within a 37.2 ft radius around this point.

Because construction continued into summer 2011, plantings were limited during spring 2011 to areas that would not be impacted by the yet to be completed construction activities. As a result, we completed no more than three

[1] 2011 report is available on the home page of our website, www.tbnep.org

circular plots along each of the transects during the fall 2011 sampling effort. Because additional areas were planted during spring 2012, we increased the number of plots along each transect during the fall 2012 sampling effort.

In addition to the sample plots located along the permanent survey transects discussed above, during each year of our survival monitoring effort we also have sampled additional plots in wetland planting areas south of the Miami River that were not located along established transects. Establishing these additional plots was necessary to increase the number of sample plots south of the river because we have been unable to safely access substantial areas along the length of the permanent monitoring transects in these planting zones during our fall sampling efforts,. A network of natural watercourses exists in this portion of the site. Once the fall/winter storm season begins these channels are too deep and wide to safely cross to reach plantings on the south half of this portion of the site. We were able to visually assess plantings in the inaccessible areas, but could not access them to establish sample plots.

Unlike plot locations along the permanent transects, these plot locations were not randomly selected before beginning field work. Instead, we selected these locations in the field and specifically picked points amongst planted specimens in areas between the permanent transects (Figure 3). Once the plot center location was picked, we assessed the status of all planted specimens within a 37.2 ft radius as described above.

Channel Cross Sections. Another monitoring activity initiated after the 2011 report is survey of cross sectional profiles of constructed stream channels on portions of the site north of the Miami River. We collected profile data where permanent monitoring transects crossed the constructed channels.

End points for each cross section were established while fiberglass measuring tapes were stretched along the entire length of each transect during vegetation monitoring efforts. Later, we determined the elevation of each end point relative to previously established benchmarks using an optical surveyor's level and stadia rod. When measuring cross sectional profiles we stretched a fiberglass measuring tape taut and level between the cross section end points. We measured the distance from the tape to the ground surface every 0.5 ft along the entire profile.

Profile data was collected during fall 2012. We were unable to measure channel cross sections immediately after construction, so we use as-designed channel widths and elevations as comparison for our post construction profiles.

B. Sampling design

We are following a Before-After sampling design for this project: we are collecting pre- and post-construction data on a set of physical and biological parameters at the restoration site only. No control or reference sites are being monitored for this study.

C. A description and explanation of any changes to the original proposal

In our original OWEB grant request we promulgated the following monitoring goals:

1. Monitor wetland hydrology, water quality, and aquatic and terrestrial habitat variables to document project related effects on water quality and aquatic and terrestrial habitats
2. Assure success of native vegetation plantings designed to restore the historical character of site vegetation.
3. Evaluate the efficacy of channel designs and construction techniques and track changes to channel profiles over time.
4. Inform future wetland enhancement projects by providing data to validate or improve design concepts and implementation and monitoring techniques used for this project.

These goals remain applicable for our monitoring efforts at the site.

We also established the following objectives for our monitoring efforts in our original grant request:

1. Establish 13 permanent linear transects along which a variety of data collection methods will be implemented over a minimum five-year period. Along these transects we will:

a. Collect vegetation data within a minimum of 65 1-m^2 quadrats for herbaceous plants and 13 0.02-acre circular plots (5 m radius) for woody vegetation during years 1, 3, and 5 post-construction to evaluate and assure planting success and document changes in on-site plant communities over time.
b. Collect 3 to 5 soil samples (at least one per elevation/hydrologic stratified zone) during years 1, 3, and 5 post-construction to evaluate changes, if any, to on-site soil conditions.
c. Continuously monitor water levels to determine project-related effects on site hydrology.
d. Monitor water quality at 10 sampling stations during years 1, 3 and 5 post-construction to determine if the project improves conditions for salmonids and other aquatic life (sampling will include quarterly grab samples at each site and logging recorders will be deployed among stations on a one or two week rotation).
e. Measure the longitudinal profile of each transect during years 1, 3, and 5 post-construction to track changes, if any, to surface elevations and channel profiles.

2. Conduct snorkel surveys and/or other fish sampling techniques during years 1-5 post-construction to monitor salmonid use of on-site aquatic habitats and evaluate the influence of large wood structures on fish use.
3. Evaluate and report information collected during the monitoring effort annually (with more extensive reporting during years 1, 3 and 5 post-construction) to inform future tidal wetland enhancement projects and monitoring efforts and satisfy grant requirements.

Our monitoring efforts at the site have deviated somewhat from these original objectives. Specific differences are:

1. We established nine permanent linear transects instead of 13. A 10th transect was established for plant survival monitoring in Fall 2012.
2. We did not collect and analyze soil samples during year 1.
3. Post-construction water quality monitoring was conducted using continuous logging devices only, no grab samples were obtained.
4. To date, we have not collected longitudinal profile information from along the entire length of each monitoring transect. We have, however, completed channel cross sections where transects cross stream channels.

D. Use of graphs, charts, maps, and photographs to convey information where appropriate.
These items are provided below along with a preliminary summary of what has been learned to date.

E. A description of where data can be obtained.
Information collected during monitoring efforts at the site is housed at the Tillamook Estuaries Partnership office in Garibaldi, Oregon. We prepared an extensive report documenting our baseline data collection and analysis efforts. An electronic version of this document can be obtained from our website, www.tbnep.org. Future reports also will be available on our website.

2. An explanation of how the information collected is to be used to inform future actions
We believe that the information collected during this monitoring effort will inform future actions in two general ways: it will guide future actions at the Miami Wetlands site, and it will inform future tidal wetland projects at other sites.

With respect to future actions at the Miami Wetlands site, we are using information obtained from our monitoring efforts to help guide our revegetation efforts. For example, we used our baseline water elevation and water quality data to assist with identifying planting zones and selecting plant pallets for the various zones. In addition, we are using our vegetation planting survival monitoring data to guide our replanting efforts.

With respect to informing future wetland projects, we anticipate that our monitoring efforts at the Miami Wetlands will inform our baseline data collection efforts (e.g., selecting monitoring parameters, protocols, data collection sites, etc.) and will likely inform other aspects of planning for and implementing such projects. For example, our channel cross section data may inform future tidal wetland channel designs and our vegetation monitoring data will likely inform our future restoration planting actions.

3. A summary of what has been learned.

Before the Miami Wetlands Restoration project began, the site was highly modified from historical conditions. It was once a tidally-connected, spruce-dominated wetland with a network of natural channels. Through human manipulation, it became a densely vegetated herbaceous wetland dominated by Reed canarygrass with a muted tidal signature and a reduced and highly modified channel system. Project goals are to restore the site to a semblance of its former self, with increased woody cover, native-dominated vegetation communities, and more natural and well-connected hydrological conditions.

It has been slightly over one year since construction activities were completed at the site and vegetation restoration actions are still being implemented. Some aspects of the site were immediately altered as a result of the project (e.g., channels) and resulted in very pronounced visual changes to the site, but other aspects will change more gradually and long-term monitoring will be required to fully understand and demonstrate these changes. For example, channel construction resulted in dramatic and immediate visual changes to the site, but long-term monitoring will be needed to understand how the modified channels have influenced hydrological conditions and how vegetation community distribution, composition and structure has responded to project activities.

As noted earlier, we have completed the following monitoring activities since construction activities ended in summer 2011:

1. Vegetation Monitoring
    a. line-intercept transects (spring 2012),
    b. 1m2 herbaceous plots (spring 2012),
    c. 5m radius tree/shrub plots (spring 2012), and
    d. restoration planting survival monitoring (fall 2011 and 2012)
2. Channel Cross Sections
    -Hobson-Struby creeks channel and tidal channels (fall 2012)
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Through these monitoring activities we have collected a large volume of information. For example, we have collected nearly 10,000 water level and temperature readings at each of the eight water elevation monitoring wells since construction activities were completed. At this time, we have not fully analyzed all of the data we have collected. Therefore, in this section we will provide some preliminary results from our monitoring data and elaborate on our general impressions of how the site has responded since summer 2011.

1. Vegetation – Vegetation at the site appears to be responding positively to our actions; native species appear to be increasing, non-native and invasive species appear to be declining, and the diversity and abundance of woody plant species have increased.

    a. Line-intercept transects-We have completed a preliminary analysis of line-intercept data collected during spring 2012. Line-intercept data was collected along each of nine permanent monitoring transects established during baseline data collection efforts (Figure 1).

        Although there are many similarities between pre-construction data and this year's data, there are some notable differences. These include:

        i. Mean percent total cover remained high, but fell slightly from 95% (pre-construction) to 92% (post-construction).

            -This is attributable primarily to increases in open water encountered at channel crossings and, to a lesser extent, bare ground associated with construction disturbances and revegetation efforts (weed mats around planted trees and shrubs were counted as bare ground in our analysis).

ii. Although Reed canarygrass is still very common, mean percent relative cover of this species has decreased from approximately 62% (pre-construction) to 58% (post-construction).

iii. Mean relative cover for native wetland graminoids (Slough sedge, small-fruited bulrush, Baltic rush, and soft rush) has increased slightly from approximately 4.1% (pre-construction) to 4.7% (post-construction).

iv. Mean relative cover for invasive blackberries fell from approximately 3.5% (pre-construction) to 0.5% (post-construction).

v. Seedings and other plantings associated with our restoration planting efforts accounted for nearly 5% of the vegetative cover at the site during 2012.

b. We have not fully analyzed data from the $1m^2$ herbaceous vegetation plots and 5m radius tree/shrub plots. We completed 90 herbaceous plots and trees/shrubs were encountered within 5m of 68 (75%) of these plot locations. In comparison, we sampled 112 herbaceous plots during our pre-construction sampling efforts, but only encountered trees/shrubs within 5m of 44 (39%) of these plots. A majority of the trees/shrubs encountered during 2012 were young plants associated with our restoration planting efforts.

In our baseline report, we used data from these plots primarily to characterize vegetation communities at the site. We have not yet completed similar analyses with the 2012 data. However, we anticipate that it will take several years before significant changes in vegetation community distribution, composition and structure are discernible.

c. We have completed restoration planting survival monitoring during each of two years (fall 2011 and fall 2012).

i. Wetland Planting Zones (Figure 2, Zones A, B, C, D, E, F, G, J, K, L, and M)

We sampled 20 0.1-acre plots in our wetland restoration planting zones during fall 2011 (approximately 10% of the wetland area planted during spring 2011). In general, tree and shrub survival was very high during this sampling effort (93% and 88%, respectively). In addition, we did not record a single mortality among cuttings (predominantly willow stakes) during this first year. Herbaceous species planted during spring 2011 (slough sedge, small-fruited bulrush, and cow parsnip), however, did not fare as well (overall survival rate = 45%). We believe that the high mortality among these plants was, at least in part, due to unusually cold weather that occurred shortly after the plants were delivered to the site, but before they were planted. During this time, the plants were stored in boxes and each individual plant was in a small propagation container. As a result, roots were above ground and vulnerable. We believe that their roots were damaged by the cold and this resulted in the high mortality we observed among these plants.

Because additional wetland planting zones were planted during spring 2012, we increased the number of survival monitoring sample plots during fall 2012 (we sampled 31 0.1-acre plots during 2012). In addition to analyzing survival rates for all wetland planting zones combined, we also completed separate survival analyses for areas planted during 2011 and those planted during 2012.

A combined analysis of 2011 and 2012 plantings revealed that survival rates for planted trees, shrubs, cuttings, and forbs in the wetland planting zones) remained fairly high (74%, 71%, 92%, and 61%, respectively).

When analyzed separately, survival rates for the 2011 planting zones remained similar to our year one results: trees = 83%, shrubs = 80%, cuttings = 93%, and forbs = 59%[2]. Results for the 2012 planting zones, however, varied from this pattern. These plantings occurred entirely in the northwest portion of the project site (Figure 2). While cuttings and forbs fared well in this area (89% and 77% survival, respectively), tree and shrub survival was quite low (45% and 39%, respectively). We attribute these low rates primarily to beaver activity. Trees were caged to protect them from beaver predation, but shrubs were not. There was some evidence of predation (particularly among shrub species), but considerable tree and shrub mortality appeared to be associated with prolonged inundation caused by beaver dam construction. Beaver activity appears to have increased in this area since 2011 and portions of the 2012 planting zones became considerably wetter than they were before they were planted. It appears that the area was just too wet for the young trees and shrubs to survive. In drier portions of the 2012 planting zones, survival of tree and shrub species was similar to survival rates in our 2011 planting zones.

As noted above, we will use data from our survival monitoring efforts to inform our mortality replacement plantings in areas where we have observed greater than acceptable tree, shrub and forb mortality. For example, in the areas recently affected by beaver activities we will likely replant with species more tolerant of very wet conditions and increase our caging efforts to reduce beaver predation. In addition, this information also will inform the density-increase plantings we have planned for some of the wetland zones.

ii. Riparian Planting Zones (Figure 2, Zones H and I)

As noted above, we did not sample restoration plantings in the Riparian Planting Zones (Zones H and I). Instead, our restoration planting contractor has conducted a complete census of these plantings. He did not differentiate among species or growth form (i.e., trees and shrubs), but instead simply counted live and dead individuals. Both of these planting zones were planted during spring 2011. Survival monitoring for these zones was completed during fall 2011 and fall 2012.

Results for 2011 were:

	Plants Inventoried	Plants Alive	Percent Survival
Zone H -	1,273	1,166	92%
Zone I	408	397	97%

Results for 2012 were:

	Plants Inventoried	Plants Alive	Percent Survival
Zone H -	1,273	1,147	90%
Zone I	408	390	96%

At this time, survival within the riparian planting zones is extremely high, and we do not anticipate any mortality replacement plantings or density increase plantings for either of these zones.

2. Channel Cross Sections

As noted above, we surveyed channel cross sections during Fall 2012 but were unable to measure profiles immediately after the channels were constructed. As a result, we compare our 2012 profiles to as-designed channel widths and bottom elevations. We measured four cross sections on the newly constructed Hobson-Struby creeks channel (Channel C/D – construction designs designated the upper

[2] We attribute the rise in survival between 2011 and 2012 among herbaceous species to vegetative reproduction by surviving plants. We planted herbaceous plants in groups of three and each planting site was marked with a bamboo stake. During sampling, we recorded the number of surviving plants around each stake (from 0 to 3 individuals). In 2011, it was easy to identify the individual specimens we planted and where these had died or were missing. However, in 2012 surviving forbs had often reproduced and it was difficult to discern between planted individuals and rhizomatous growth (which was often dense and covered the entire area where the original plantings occurred). In such instances, we would count three live plants. It is probable that at some of these sites we were counting reproductive growth and not the original planted specimens.

portion of this channel as C channel because this area had a transitional channel design and the lower portion was considered D channel because this portion had the U shaped design of the other tidal channels), two profiles on tidal channels E and E2, and one profile on tidal channel E3 (all U shaped tidal channel designs). Figures 3 and 4 are an aerial photograph depicting the cross section locations and graphs of the channel profile data, respectively.

Based on our data, the Hobson-Struby creeks channel has aggraded approximately one foot along much of its length, but channel width has not changed appreciably since construction (Figure 2 – Sections C-B, C-C, C-D and C-E). These data agree with our general impression of what has occurred along this channel based on incidental visual observations we have made since construction was completed. We have observed that the stream appears to have more active flows than when it was conveyed in its former ditch-like channel prior to implementation of restoration actions. In addition, we have observed recruitment and deposition of silt, sand, gravels and other streambed materials along the length of this channel (particularly along the inside of bends in the channel – see Sections C-C, C--D and CE) and, although we have observed some localized sloughing of bank material, the banks of this channel have appeared relatively stable.

The primary tidal channels (E channels) have responded more variably. The lower portions of these channels appear to have remained relatively stable since construction: there has been some localized sloughing of bank material that has widened and aggraded the lower reaches of these channels somewhat in places, but in general channel width and bottom elevations remain similar to the original channel designs (Sections E-E and E2-E). Although we have observed sloughed material lingering for short periods, it appears that tidal flow in the lower portion of these channels has been sufficient to minimize accumulation of this material, but not so great as to scour the channels and substantially increase their depth.

The upstream portions of the E channels, however, have changed more substantially since they were constructed and each channel has responded somewhat differently. Bottom elevation in the upper portion of the E2 channel (Section E2-D) has aggraded a few inches and there has been some localized bank sloughing which has widened the channel in places. Bottom elevations in the upper portions of Channels E and E3, on the other hand, have aggraded a foot or more above design elevations. Localized sloughing of bank material also has occurred along these channels. Bottom elevations in the upper portion of the E2 channel were considerably lower than the E and E3 channel to begin with, and as a result this channel is more regularly inundated with tidal flows. It seems likely that this more frequent and energetic flow pattern has reduced deposition of bottom materials in this channel as compared to the upper ends of the other E channels. We attribute the accumulation of bottom materials in the upper portions of the E and E3 channels to their higher beginning elevations and the less frequent tidal inundation that results from this elevation difference.

3. Snorkel survey for juvenile fishes

We completed a snorkel survey for juvenile fishes in the Hobson-Struby creeks channel and portions of the tidal channels during April 2012 (Figure 5).

Visibility in the tidal channels was extremely poor. In fact, in many places we recorded visibility as “the edge of our mask.” As a result, we did not observe any fishes in these channels during the survey. We have observed fishes in these channels incidental to other fieldwork, however. Juvenile salmonids (some coho, but most unidentified) have been observed on many occasions in the lower portions of the tidal channels and large schools of stickleback have been observed throughout these channels.

Visibility was much better in the Hobson-Struby creeks channel and we were able to observe many juvenile fish in this channel during our survey. Not surprisingly, all of the fishes we observed were located near and within the large wood structures constructed during 2010 and 2011. The lower portions of this channel were more turbid than upstream sections. This turbidity coupled with turbulence created by swift flows around the wood structures compromised visibility in this area to the extent that we were unable to positively identify fishes we observed (beyond the fact that they were quite obviously salmonids). Based on other observations in this channel, we assume they were juvenile coho, but since we could not positively identify them we report them here as unidentified juvenile salmonids. Visibility was much better in the upper portion of this stream and we were able to identify the fishes we observed in this area. During our survey effort we observed the following in the Hobson-Struby channel:

46 – unidentified salmonid parr[3]
26 – coho par
2 – salmonid fry (unidentified)
1 – steelhead smolt

We also have observed salmonids in the Hobson-Struby channel incidental to other field work since completion of construction activities at the site. We have observed fish along the entire length of this channel, particularly near the large wood structures and in the pool at the outlet of the culvert that passes Hobson Creek under the Miami-Foley Road. We observed a group of fish (species and number of individuals unknown) when we were entering this pool during our 2012 snorkel survey (a beaver dam creates the pool, so a snorkeler has to climb over the dam to enter the pool). The fish retreated into the culvert as we entered the pool and did not emerge while we were in the pool. As a result, we were not able to count or identify any of these fish during our survey effort. None of the fish from this group are included in the observations reported above.

The number of juvenile salmonids observed during the 2012 effort, is comparable to observations made during the pre-construction snorkel survey conducted in 2010. However, survey conditions during 2012 were less favorable than during 2010 because the 2012 survey was conducted during a period of higher stream flows. During 2012, we observed groups of 20+ juvenile salmonids at three of the large wood structures along the Hobson-Struby channel. During the 2005-2007 rapid bio-assessment juvenile snorkel surveys (Bio-Surveys, LLC. 2005, 2006 and 2007), the largest single group observed at stations within the Miami Wetlands site was nine (eight coho and one cutthroat). They also reported very poor visibility at many survey stations.

4. Water elevation monitoring with data loggers at eight well sites

We have continuously monitored water elevation and temperature at eight well sites since construction activities were completed (Figure 6 - six sites north of the river, one in the river channel, and one in channel south of the river). Loggers are set to collect a data point on a one hour interval. As a result, we have gathered tens of thousands of data points since summer 2011.

We have not completed our analysis of these data at this time. However, based on a preliminary review of this data it appears that:

a. Precipitation remains the primary driver of water surface elevations at the site.
b. Water surface elevations remain similar to pre-construction levels at wells north of the river that are not in close proximity to the pre-construction ditch system.
c. Water surface elevations have dropped at wells located in close proximity to the old ditch system (despite the fact that many of these wells are located in close proximity to new channels). This makes sense when one considers that the old ditch system (including the old Hobson-Struby creeks channel) supported several well-established beaver impoundments. As a result, areas in close proximity to the channels were regularly inundated. Similar impoundments do not currently exist along the newly constructed channel segments, so inundation of lands lateral to the channels has decreased.
d. Water surface elevations in the channel south of the river appear consistently higher than during pre-construction monitoring. During other monitoring activities at the site, we have noticed that this area appears wetter now than prior to construction activities. At this time, we cannot explain this apparent phenomenon, but beaver activities seem to be the most likely explanation.

[3] Parr-The developmental life stage of salmon and trout between alevin and smolt, when the young have developed parr marks and are actively feeding in fresh water.
Fry-An early stage of development in young salmon or trout. During this stage the fry is usually less than one year old, has absorbed its yolk sac, is rearing in the stream, and is between the alevin and parr stage of development.
Smolt-Refers to the salmonid or trout developmental life stage between parr and adult, when the juvenile is at least one year old and has adapted for life in the marine environment.

5. Water quality monitoring

We have collected post-construction water quality data in two ways: 1) we have deployed dissolved oxygen (DO) and conductivity/temperature loggers at different locations within the site, and 2) the water level loggers also record temperature data, so we have collected water temperature data at the eight well sites discussed above continuously since before construction activities were initiated at the site.

We have established seven water quality logger stations at the site (Figure 7 - five within newly constructed channels, one at a station established in the lower tidal channel during pre-construction monitoring, and one in the Miami River). Each station consists of a 4-5 ft section of perforated 4-inch PVC pipe that is held in place near the edge of a channel with two steel t-posts. Loggers are hung within the pipe with stainless steel wire attached to a lid which screws onto the top of the pipe.

We conducted five separate deployments during summer 2012: June 27 to July 12, July 19 to August 2, August 9 to August 23, August 23 to September 5, and September 11 to September 25. We have two DO loggers (RBR Model DO-1050) and three conductivity loggers (Solinst Model 3001 LTC F30/M10) at our disposal for this project. We paired a DO and conductivity/temperature logger at each of two stations and sampled conductivity alone at a single station during each approximately two week deployment.

We sampled at each of the six stations north of the river over the course of the summer 2012 monitoring effort. We sampled stations L-2 and E-1during all sampling periods so that we could better understand estuarine influences on the newly constructed tidal channels. During some periods we sampled both DO and conductivity/temperature at these two stations and during others we sampled only conductivity/temperature. The other stations were sampled less regularly, but both DO and conductivity/temperature were sampled at these stations.

We have not yet completed our analysis of these data. However, preliminary analyses suggest that:

a. Dissolved oxygen concentrations within the channels during the critical summer months are typically at or above the State of Oregon water quality standard for estuarine and cool-water habitats (6.5 mg/l).
b. Water temperatures within the channels and ground water temperatures at the site typically remain well below State of Oregon seasonal water quality standards during all seasons (Spawning Use [Oct 15-May 15] = 13^{o}C, Rearing and Migration [year –round standard] = 18^{o}C).
c. The site is predominantly inundated by fresh water. Saline waters from the bay enter the site only during high tide events exceeding approximately 7.5 ft (but not during periods of high precipitation).
d. When saline waters enter the site, they are typically confined to the lower portions of the tidal channels (Figure 7, Stations L-2 and E-1) and only persist for the duration of the high tide event. Fresh waters fill the channels as tides recede.
e. The Hobson-Struby creeks channel is fresh water for its entire length, except when high tides exceed approximately 8.75 ft during periods of little or no precipitation. When this occurs, saline waters enter only the lower portion of the channel and can flood adjacent ground lateral to the channel (Figure 7, stations D-1 and D-2).
f. The upper portions of the tidal channels (Figure 7, Stations E2-1 and E-2) are inundated only when tides exceed approximately 6.5 ft (during periods of little or no precipitation). During these periods, salinity remains lower in the upper reaches than in the lower portions of the same channels.

Figure 8 provides graphs for conductivity measurements completed during each of the summer 2012 water quality logger deployments.

6. Marsh bird survey (Spring 2012)

   We were able to complete only a single survey session for secretive marsh birds during 2012. During this survey we detected a Sora, but no other target species were detected. Sora also was the only target species detected during pre-construction surveys. During restoration planting survival monitoring conducted in November 2012, we heard a Virginia Rail call from within the wetland area south of the Miami River. This is the first time we have detected this species at the site, but there are records of it occurring at other Tillamook Bay tidal wetlands.

4. Inform the OWEB Monitoring and Reporting Program if the data collected were used or will be used in any published report

To date, none of the data collected has been used in a published report. It is unknown at this time whether information collected at the site will be used in for any future publications.

Figure 1. Aerial photograph of Miami Wetlands Restoration Project site depicting the locations of line intercept vegetation transects.

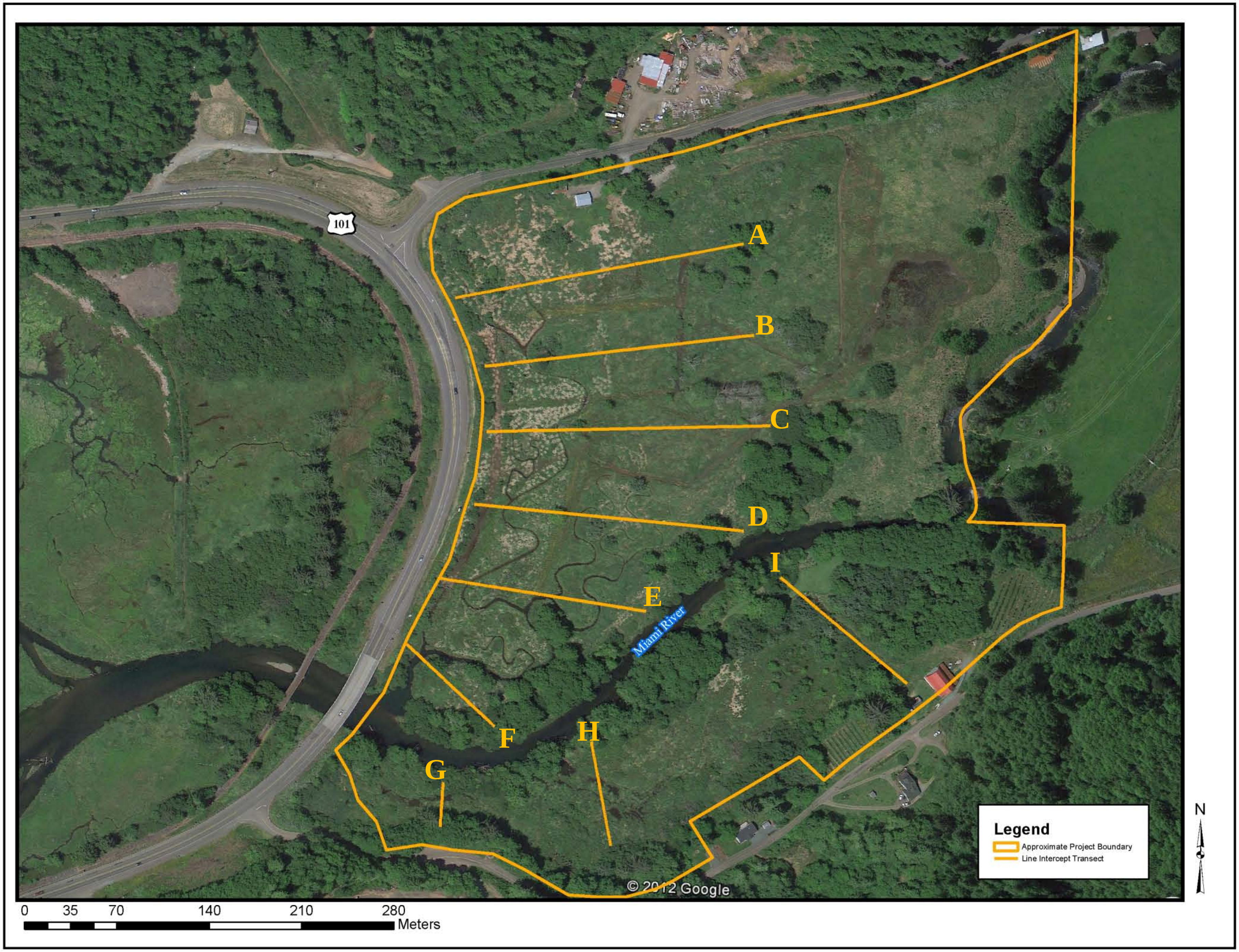


Figure 2. Aerial photograph of Miami Wetlands Restoration Project site depicting the locations of vegetation survival monitoring plots and restoration planting zones.

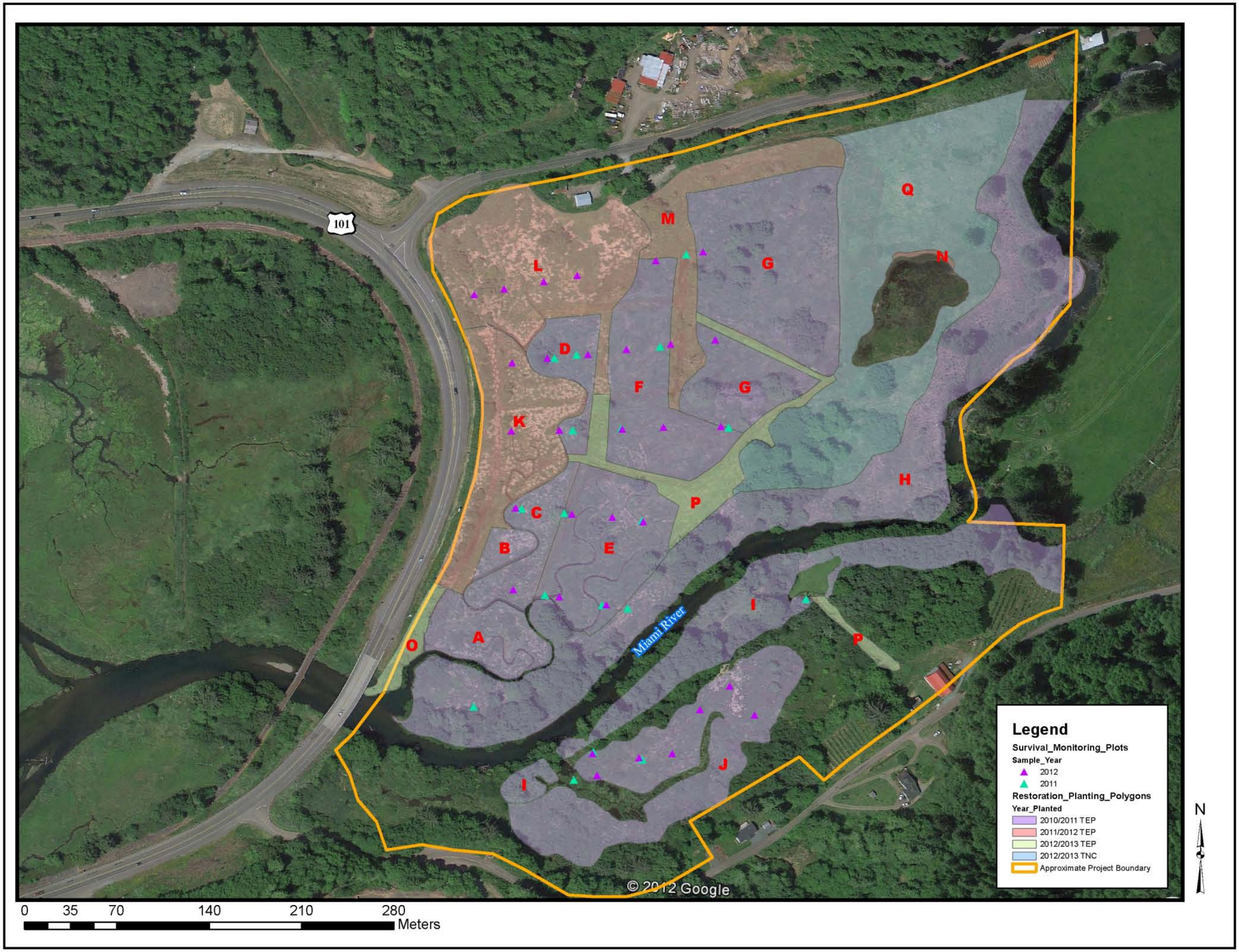


Figure 3. Aerial photograph of Miami Wetlands Restoration Project site depicting locations of channel cross sections. Cross section ID – First letter is Channel ID, second letter is the ID of the monitoring transect the cross section occurs on.

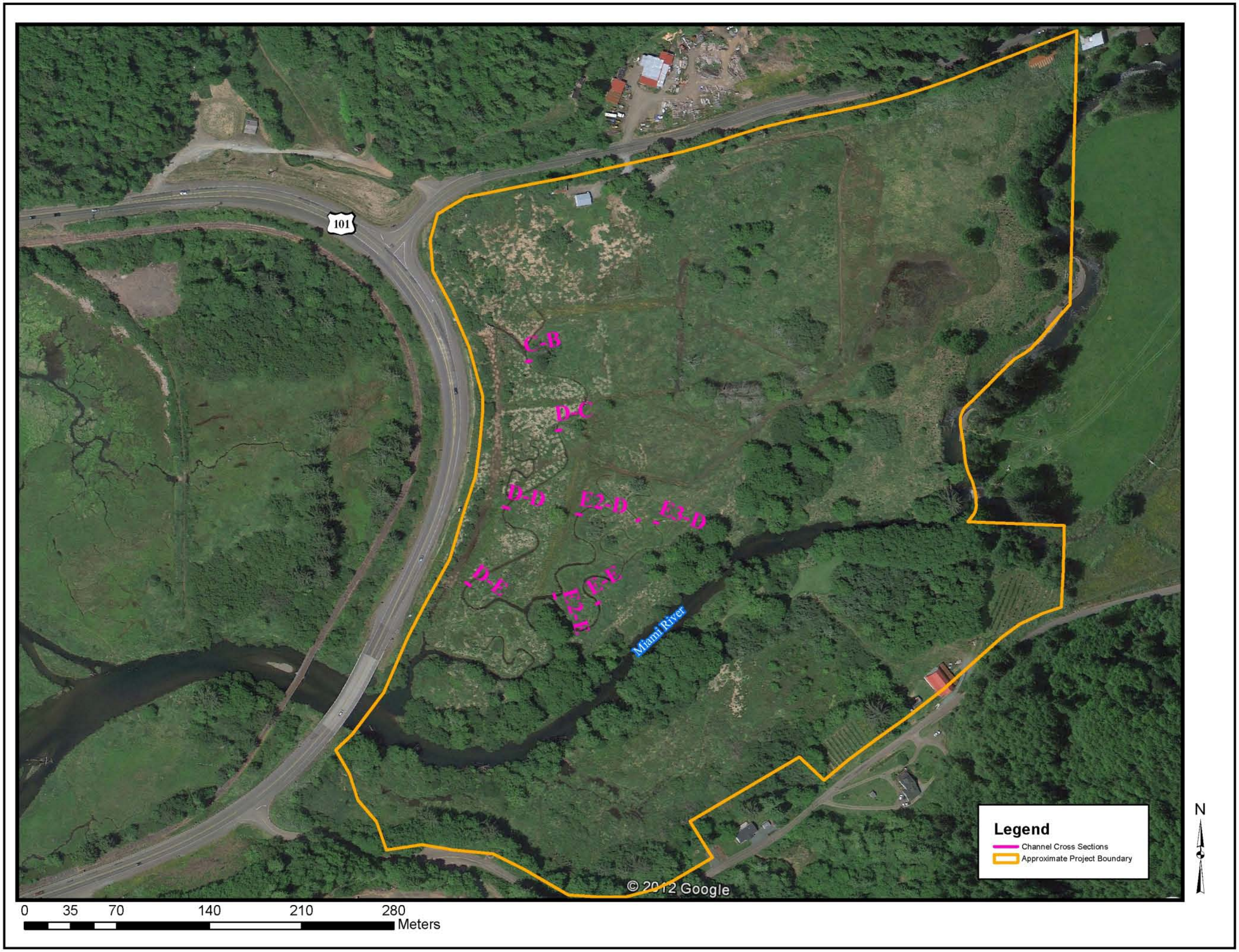
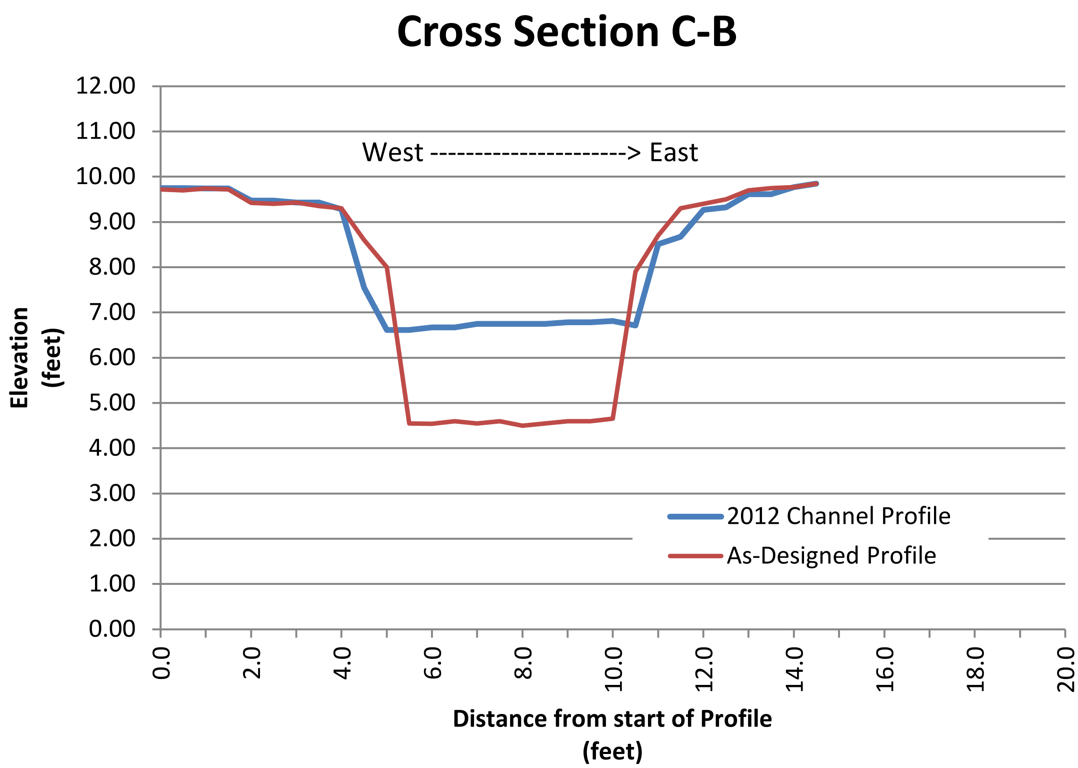


Figure 4. Graphs depicting channel cross sections at the Miami Wetlands Project site. See Figure 3 for locations of cross sections.



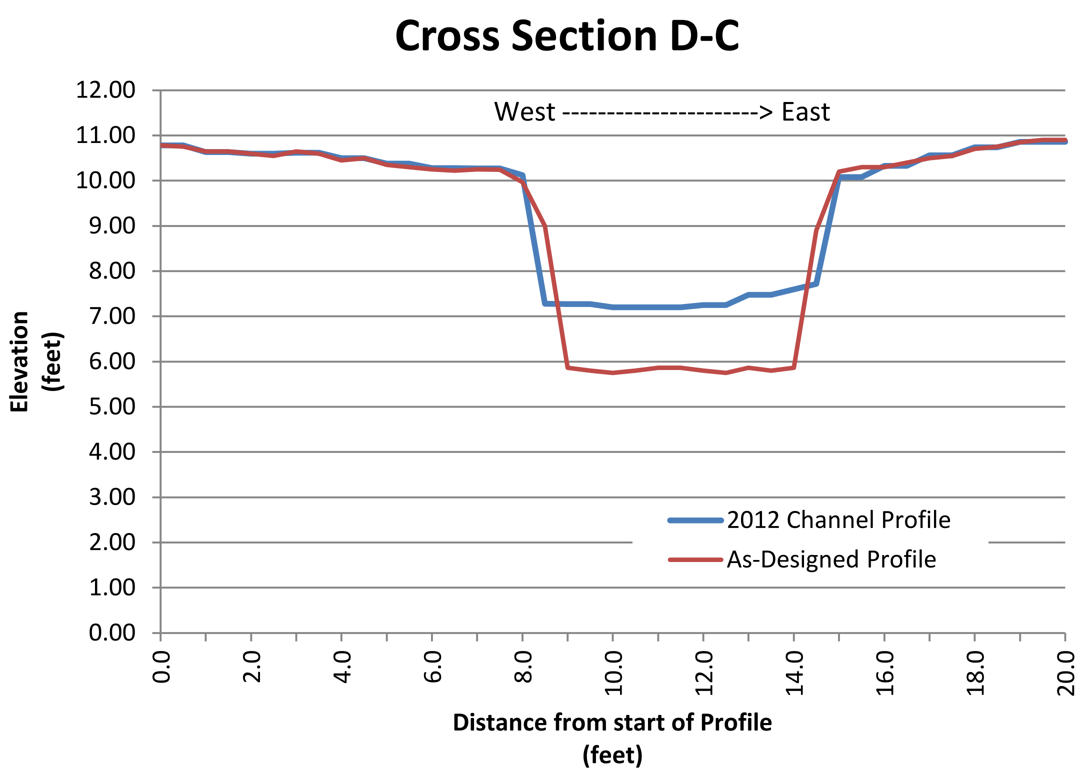
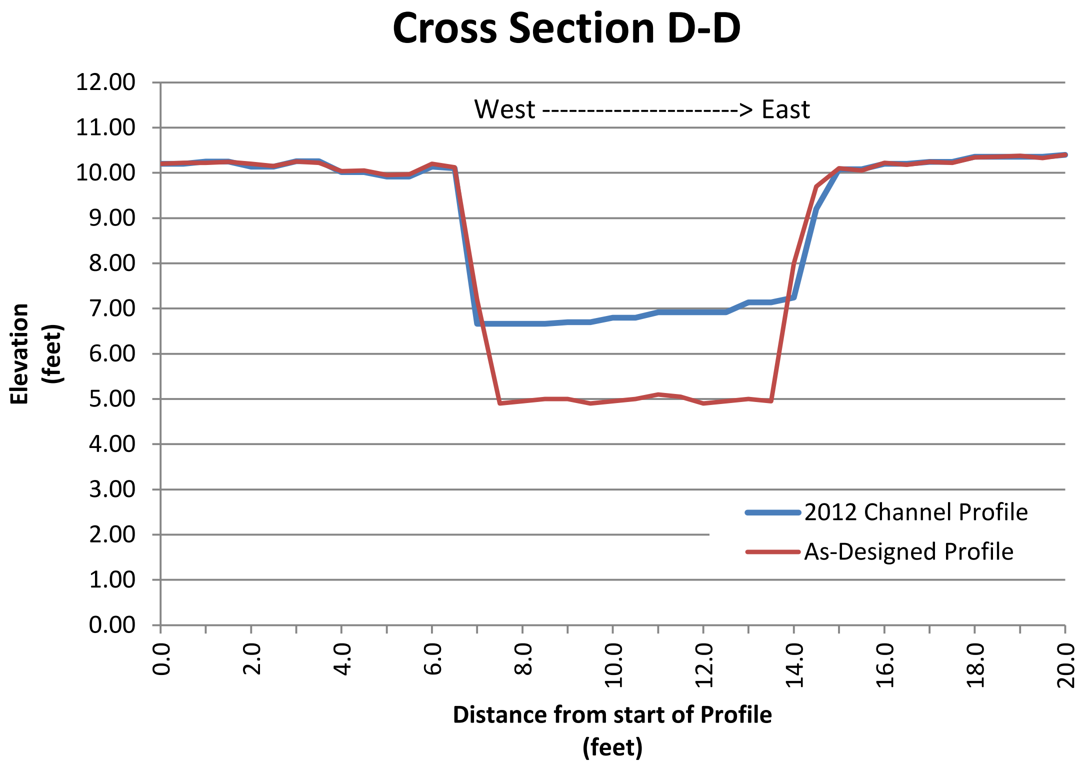


Figure 4. continued



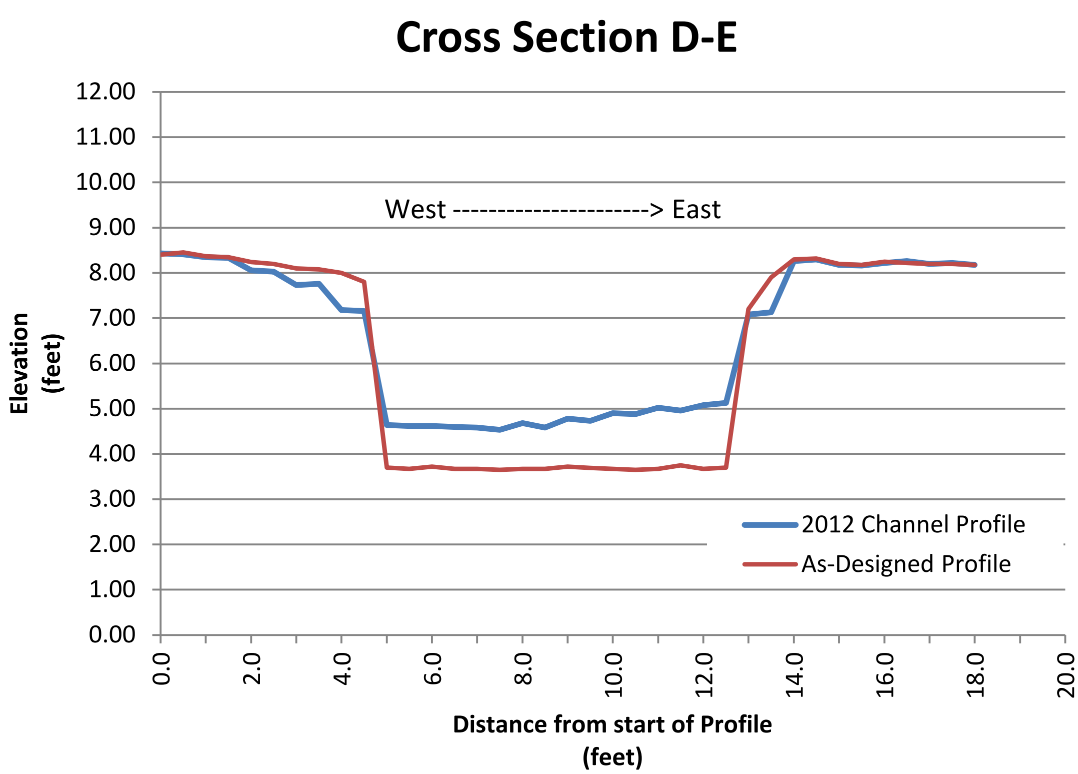
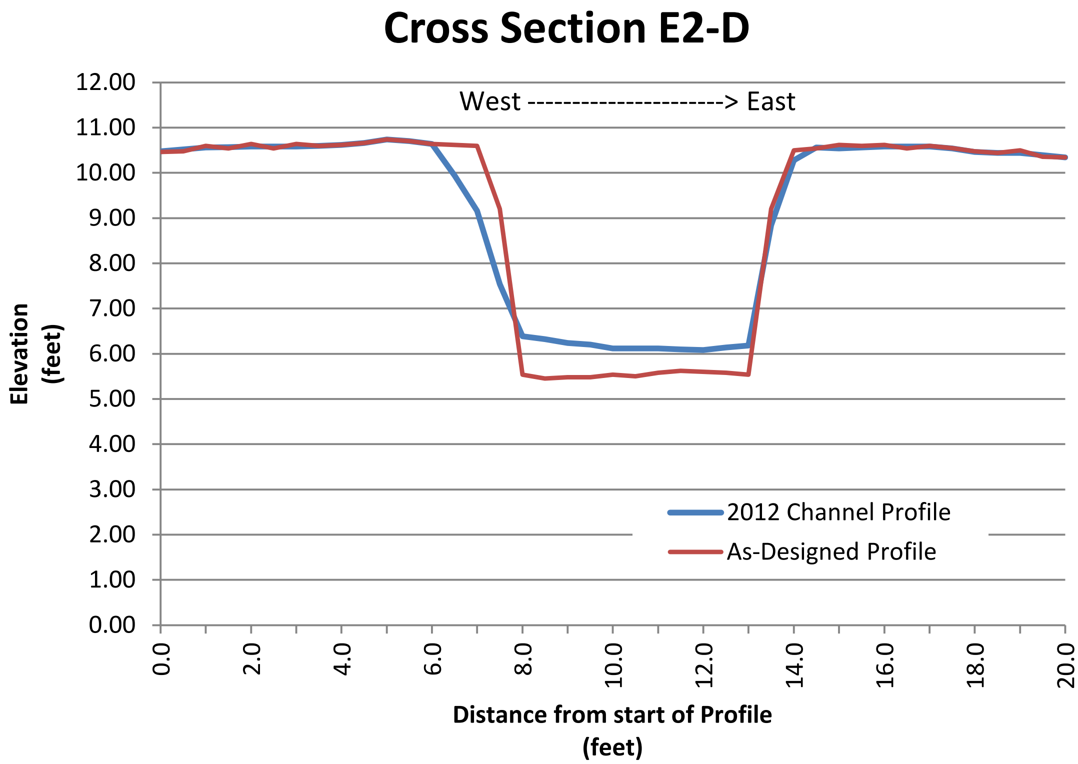


Figure 4. continued



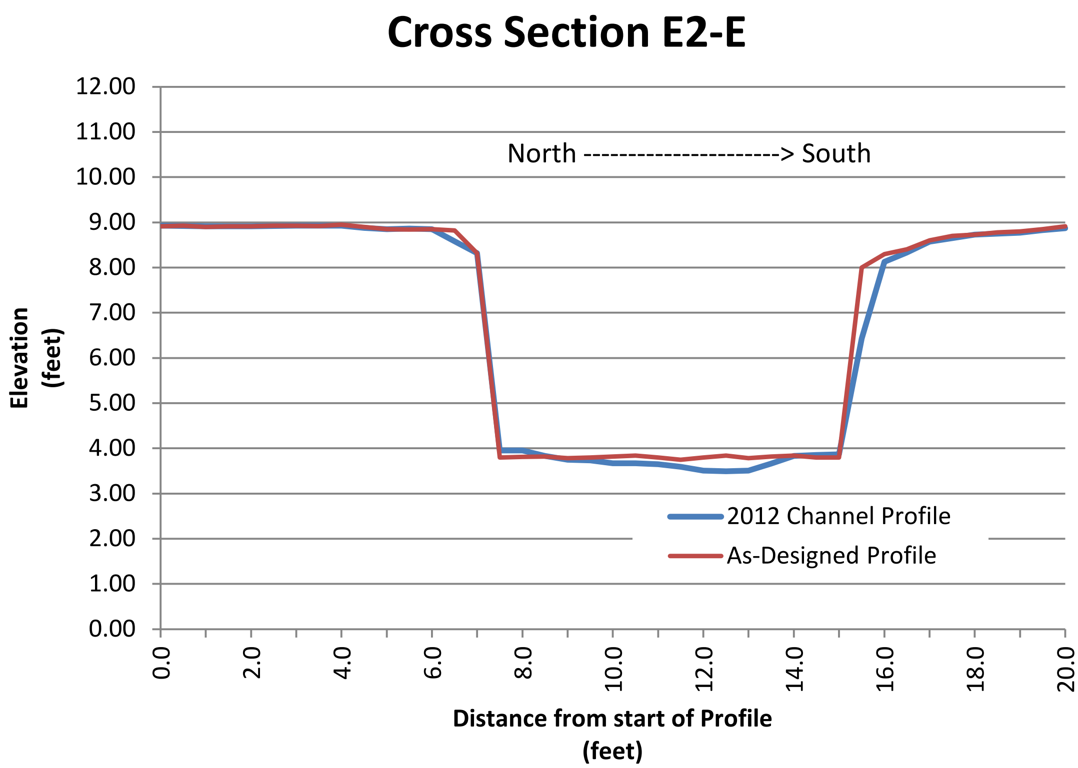
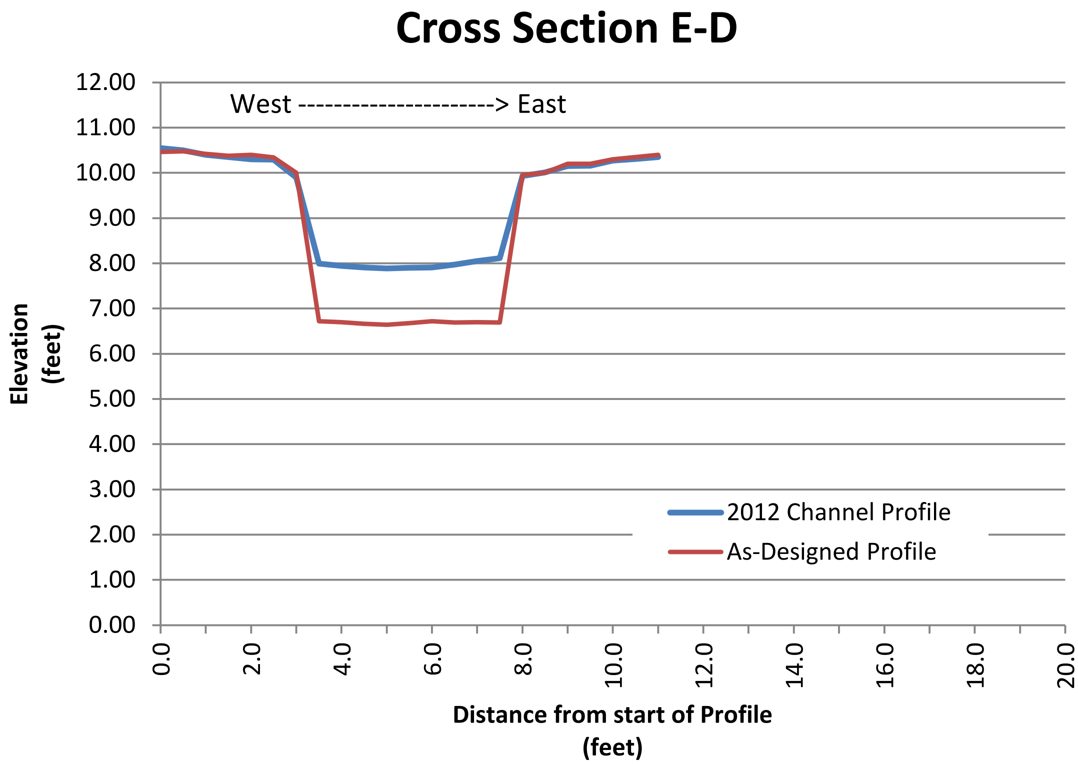


Figure 4. continued



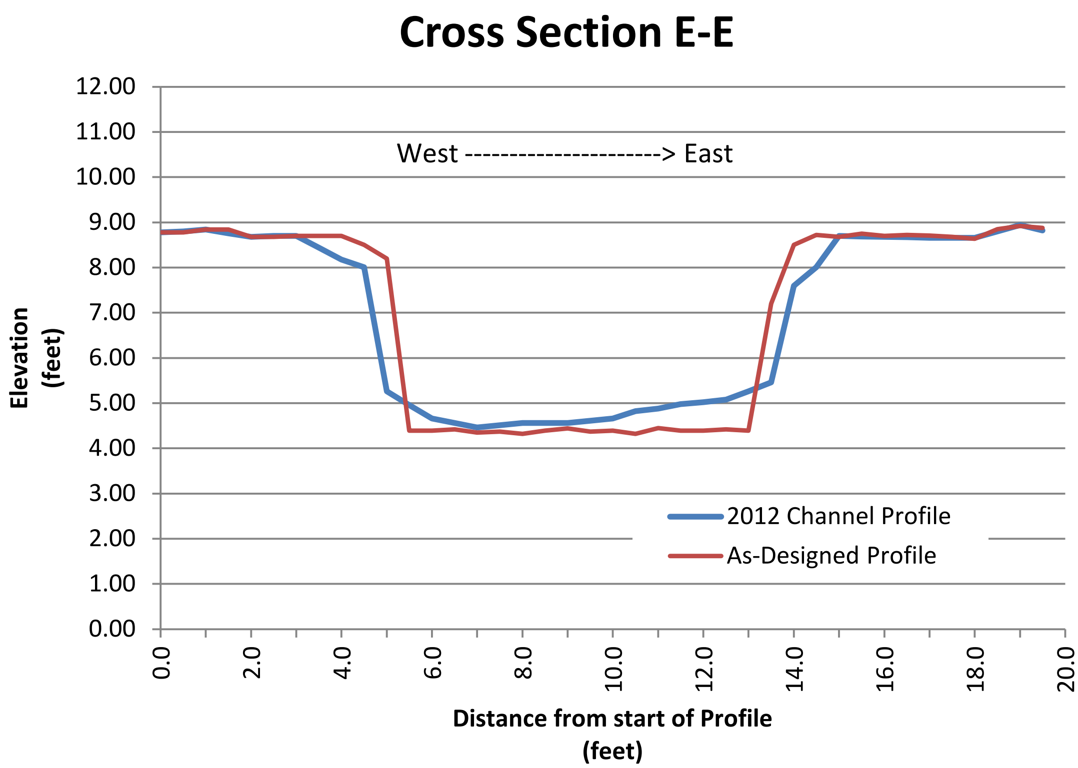


Figure 4. continued

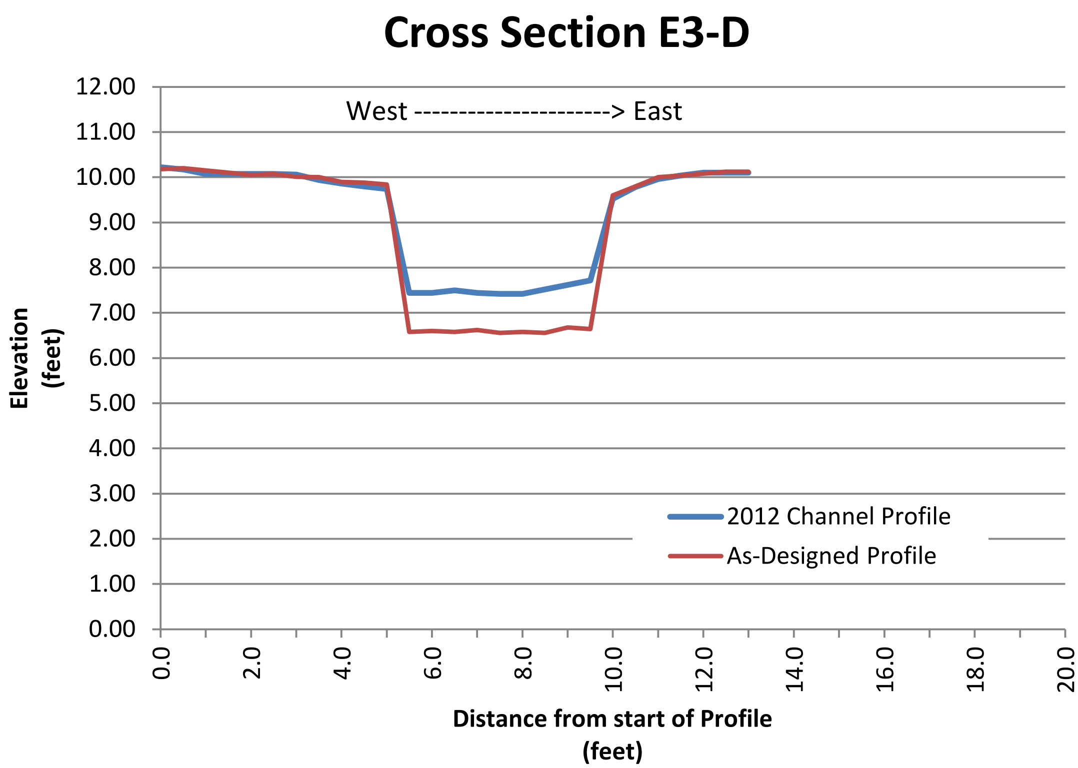


Figure 5. Aerial photograph of Miami Wetlands Restoration Project site depicting stream segments searched during spring 2012 snorkel survey.

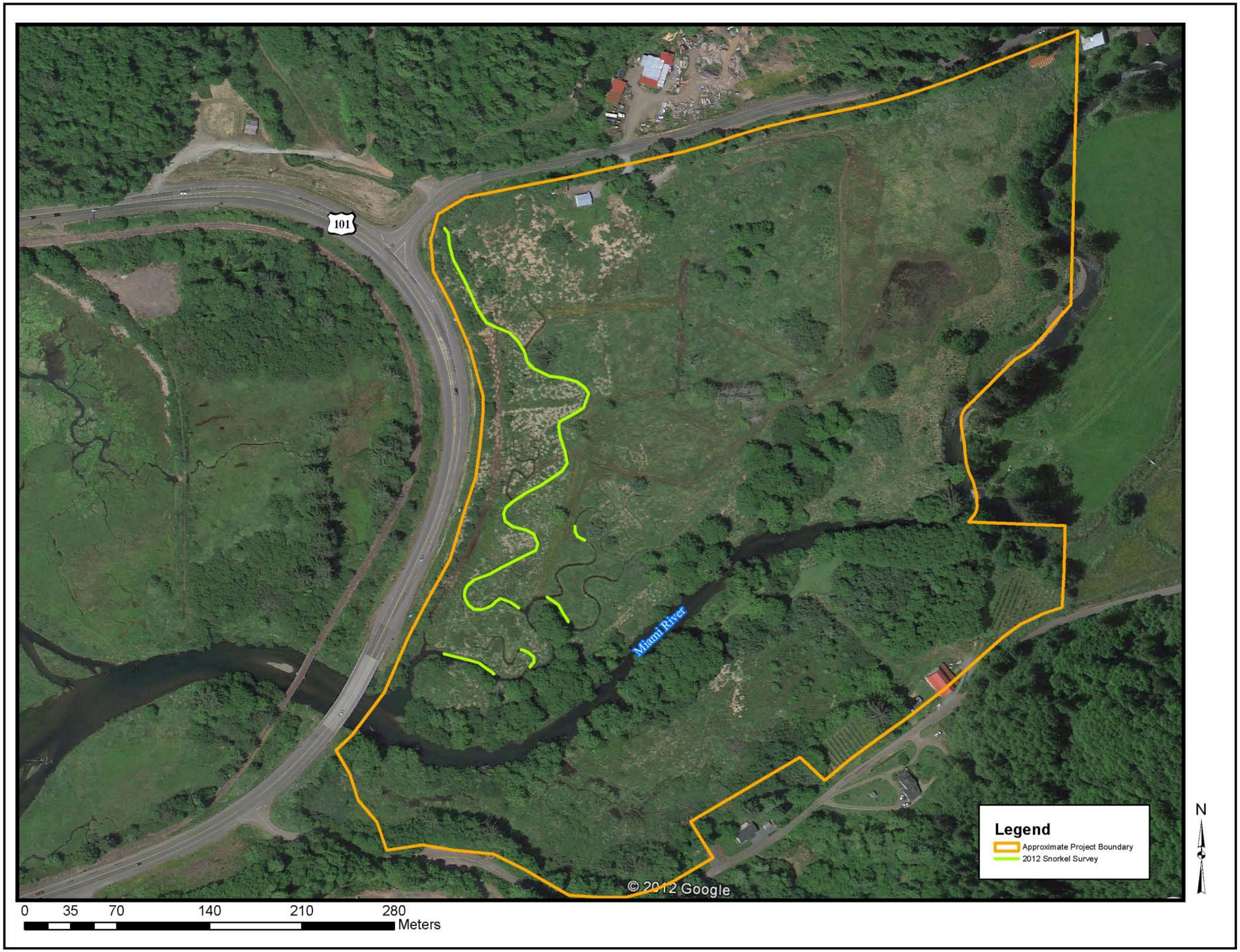
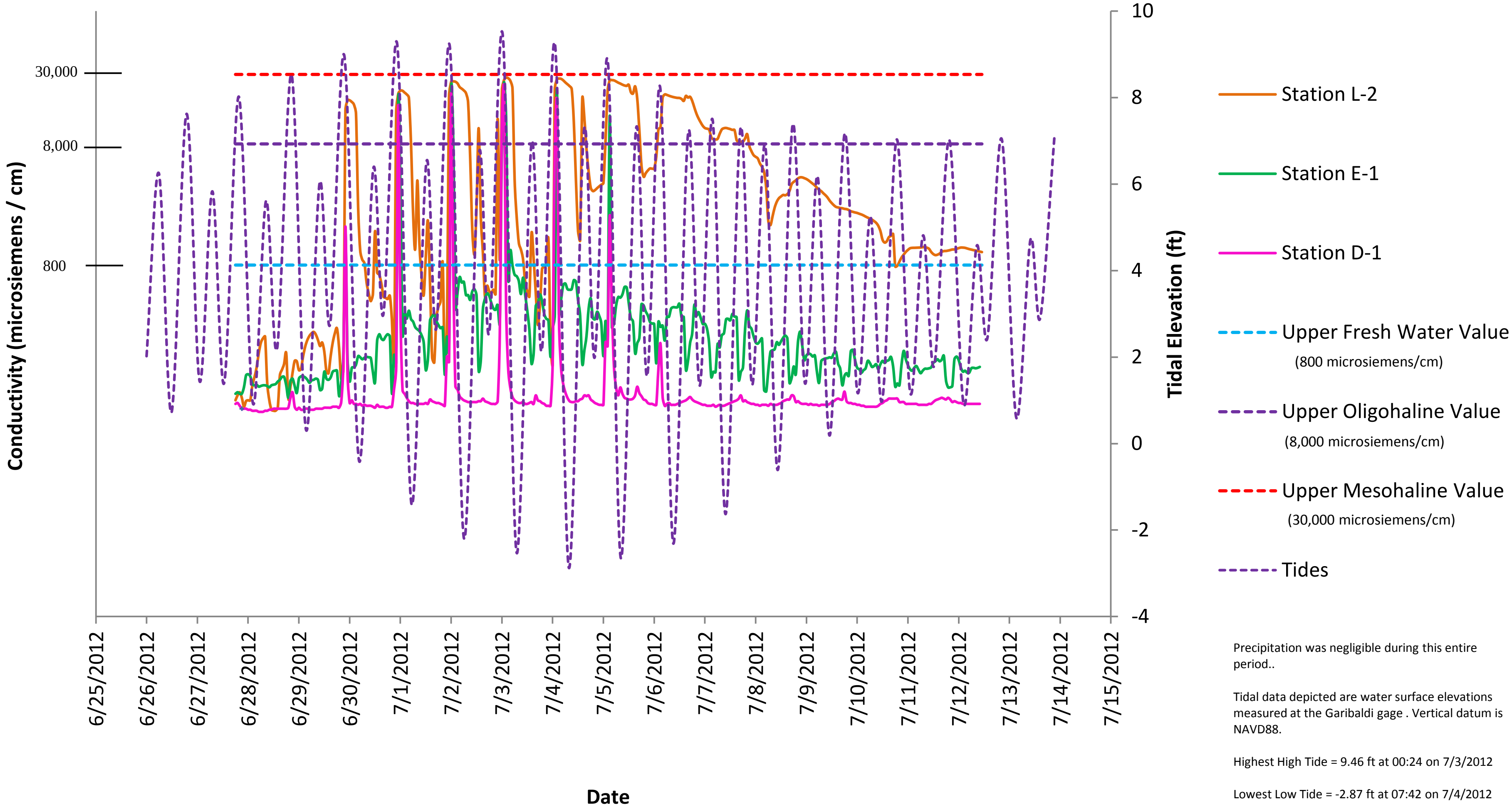


Figure 6. Aerial photograph of Miami Wetlands Restoration Project site depicting locations of water level monitoring wells. Labels that do not include a triangular marker are wells not monitored with continuous data loggers.

Figure 7. Aerial photograph of Miami Wetlands Restoration Project site depicting locations of post-construction water quality monitoring stations.

Figure 8. Graphs depicting conductivity recorded during five water quality logger deployments at the Miami Wetlands site during summer 2012. Refer to Figure 7 for station locations.

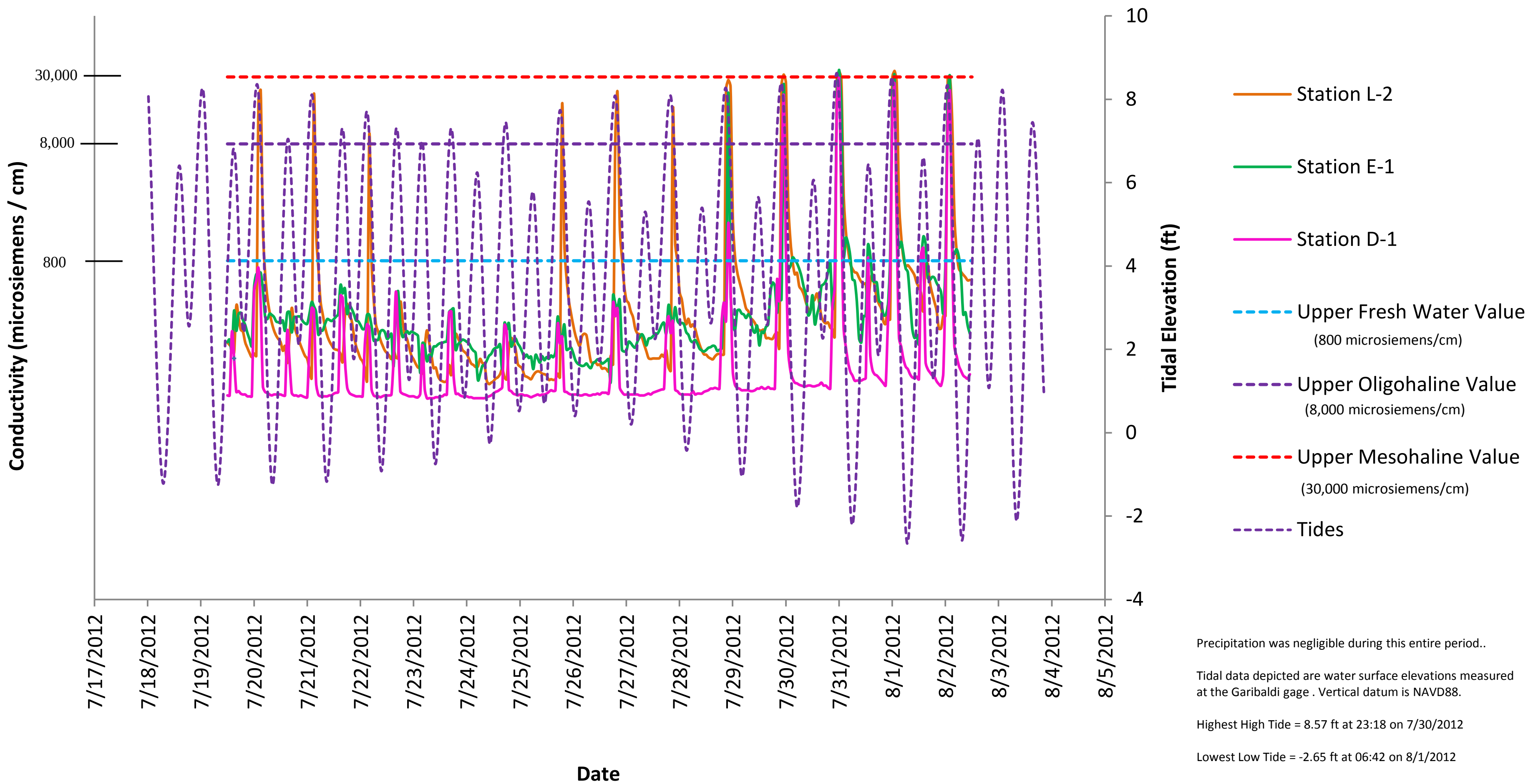


Precipitation was negligible during this entire period..

Tidal data depicted are water surface elevations measured at the Garibaldi gage . Vertical datum is NAVD88.

Highest High Tide = 9.46 ft at 00:24 on 7/3/2012

Lowest Low Tide = -2.87 ft at 07:42 on 7/4/2012

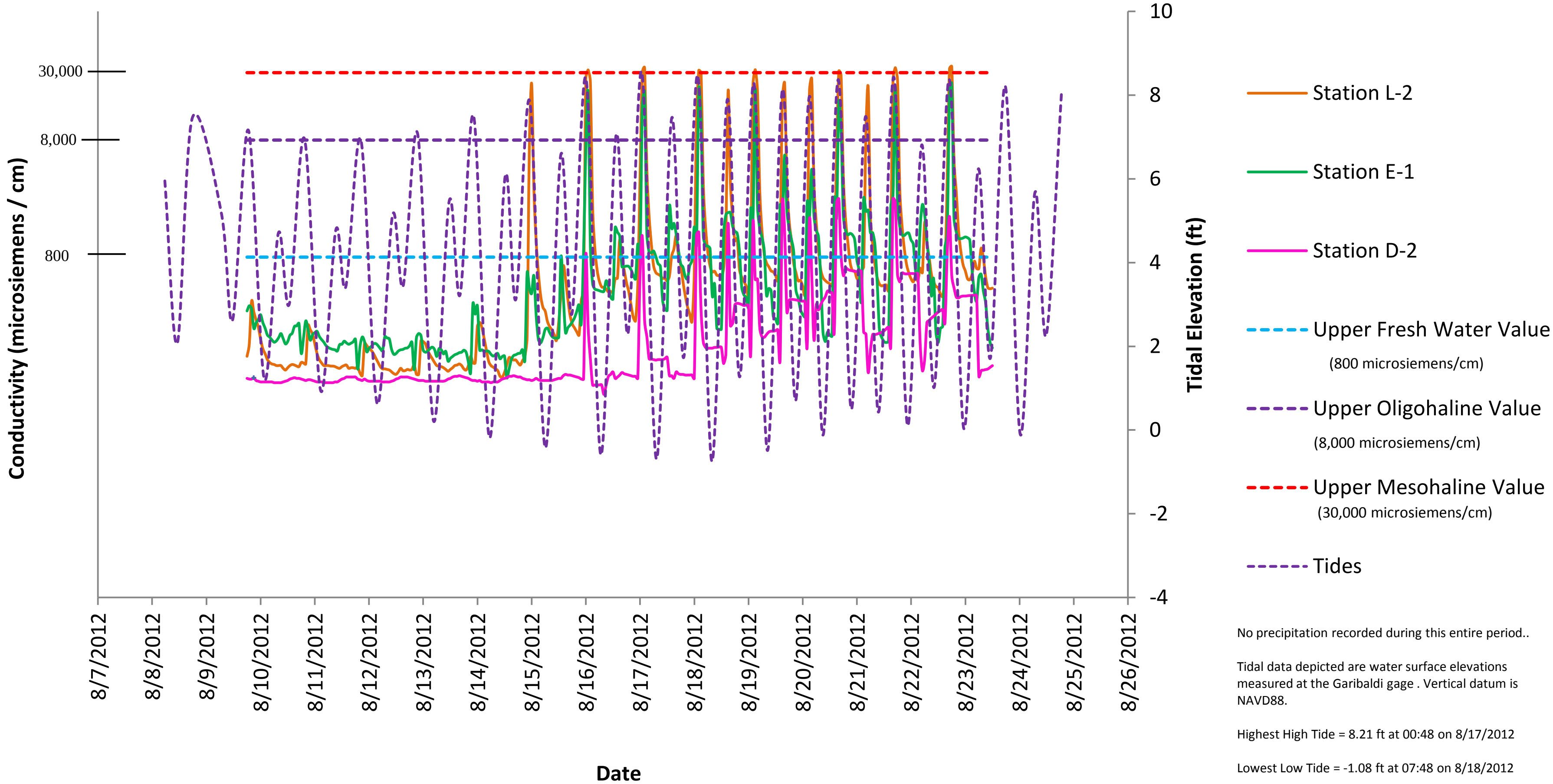


Precipitation was negligible during this entire period..

Tidal data depicted are water surface elevations measured at the Garibaldi gage . Vertical datum is NAVD88.

Highest High Tide = 8.57 ft at 23:18 on 7/30/2012

Lowest Low Tide = -2.65 ft at 06:42 on 8/1/2012

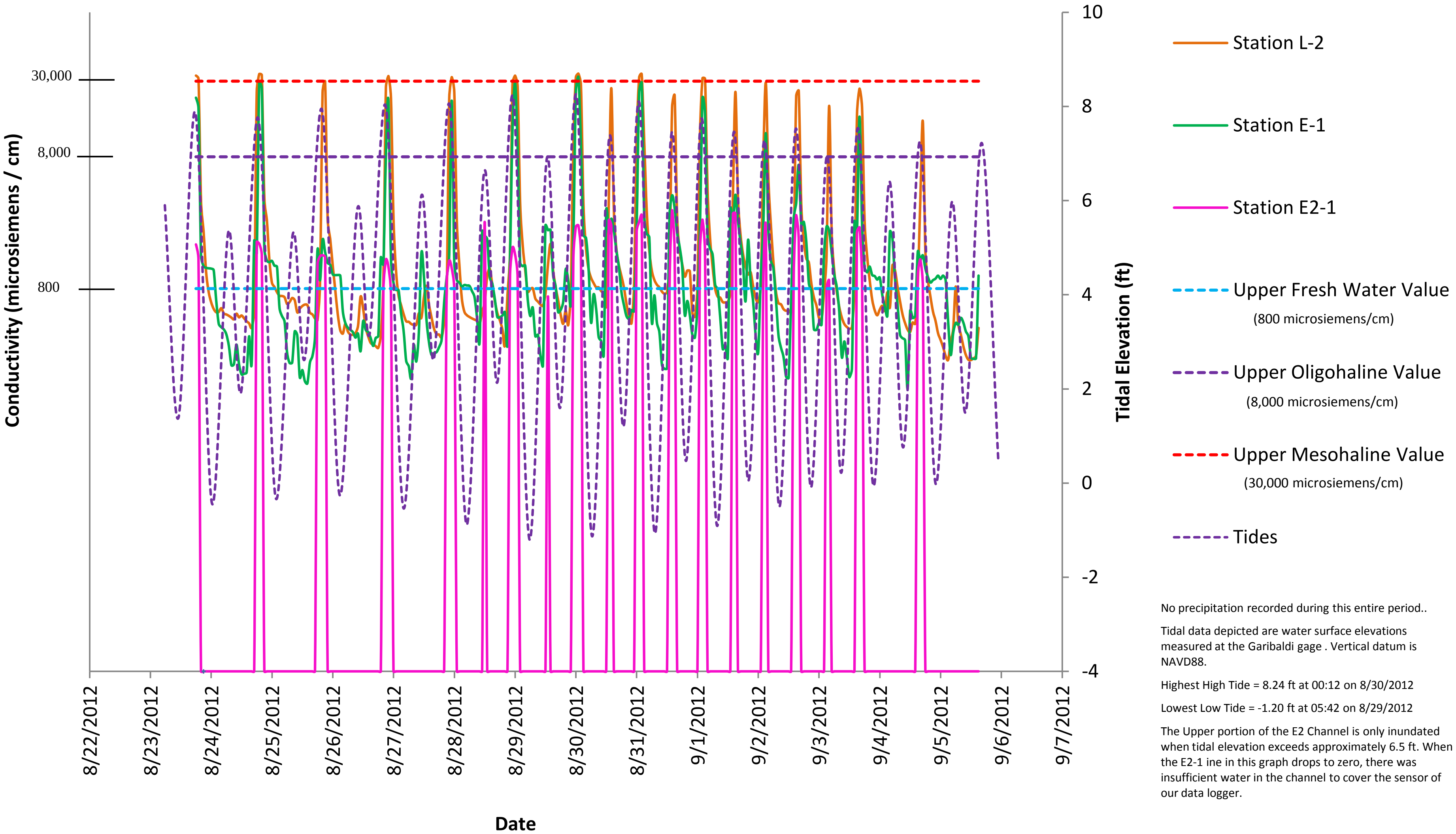


No precipitation recorded during this entire period..

Tidal data depicted are water surface elevations measured at the Garibaldi gage . Vertical datum is NAVD88.

Highest High Tide = 8.21 ft at 00:48 on 8/17/2012

Lowest Low Tide = -1.08 ft at 07:48 on 8/18/2012



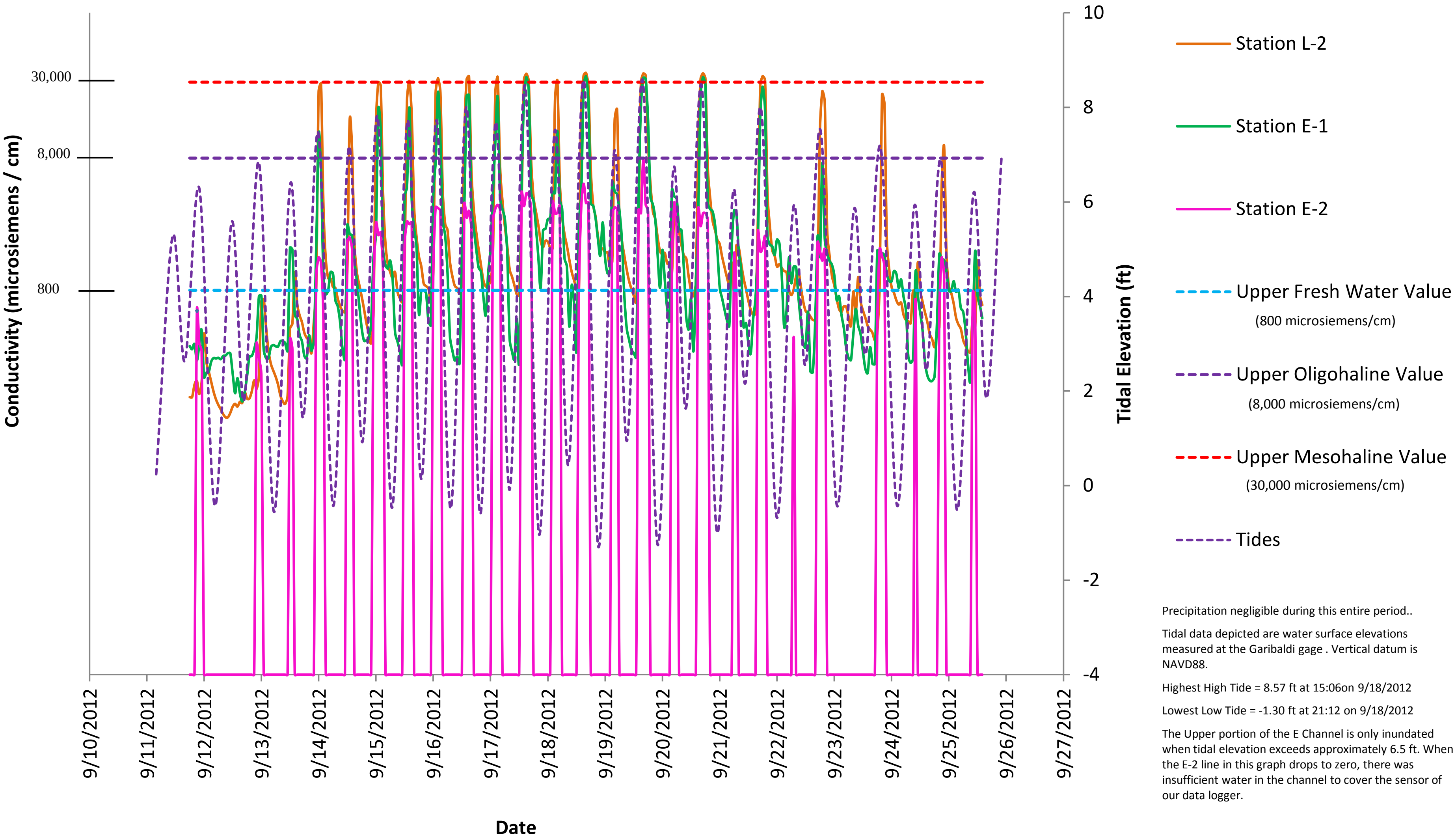
No precipitation recorded during this entire period..

Tidal data depicted are water surface elevations measured at the Garibaldi gage . Vertical datum is NAVD88.

Highest High Tide = 8.24 ft at 00:12 on 8/30/2012

Lowest Low Tide = -1.20 ft at 05:42 on 8/29/2012

The Upper portion of the E2 Channel is only inundated when tidal elevation exceeds approximately 6.5 ft. When the E2-1 ine in this graph drops to zero, there was insufficient water in the channel to cover the sensor of our data logger.



Precipitation negligible during this entire period..

Tidal data depicted are water surface elevations measured at the Garibaldi gage . Vertical datum is NAVD88.

Highest High Tide = 8.57 ft at 15:06on 9/18/2012

Lowest Low Tide = -1.30 ft at 21:12 on 9/18/2012

The Upper portion of the E Channel is only inundated when tidal elevation exceeds approximately 6.5 ft. When the E-2 line in this graph drops to zero, there was insufficient water in the channel to cover the sensor of our data logger.