

Results of Market Analysis:

The Landscape of Estuary Education in the San Francisco Bay Area

A Report Submitted to
San Francisco Bay National Estuarine Research Reserve

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Introduction: Description and Goals

Given the plethora of education programs and existing analyses in the region, the San Francisco Bay National Estuarine Research Reserve (SF Bay NERR) wanted to conduct a Market Analysis to determine what gaps (if any) exist in the market, and identify who the target audience(s) of new K-16 Estuarine Education Program could be. By surveying other environmental, marine, and estuarine education organizations in our area, we hoped to determine which audiences were being served and which audiences needed additional or different training and program offerings. The Market Analysis was also intended to help us to determine what others are doing, who their audiences are, and if there are potential partnership opportunities. If there is a gap that is not being filled by others, the analysis was designed to highlight what that gap is, and provide guidance on how we could best meet the needs of that targeted audience.

The research questions addressed by the market analysis were:

- What is the current landscape of wetlands or estuary-oriented science education programs to students and/or teachers in the nine county San Francisco Bay Area?
 - What organizations and agencies offer these programs?
 - What are the topics of those education programs?
 - What audiences do those education programs address?
 - What “types” of programs are offered?
- What are the gaps in the current offerings?
 - What audiences are not being addressed?
 - What audience needs are not being met by current estuarine/science education programs in the San Francisco Bay Area?
- Which potential audiences or needs is the SF Bay NERR well-positioned to address?
- How can we increase other estuarine education providers’ awareness and knowledge of the National Estuarine Research Reserve?

The Center for Research, Evaluation, and Assessment at the Lawrence Hall of Science administered the survey. Overall, we identified over 200 potential programs and collected data about 72 of those that were most relevant to the work of the San Francisco Bay NERR. Surveys were administered to the 47 organizations that offered the 72 programs, and we received responses from 38 programs, yielding an 80 percent response rate.

Our findings include:

- Most watershed and marine programs do not identify their programs as having an explicit component about the estuary
- More programs address students in grades 3 to 5 than any other age range.

- Of programs whose primary audience includes students in K-12, programs that address the younger elementary years (grades K-2) are least common, followed by programs that address high school students
- Despite (or maybe because of) this, programs that address high school students are more likely to be filled than are programs for elementary or middle school grade levels
- At all grade levels, respondents felt that schools wanted programs that provided hands-on, experiential learning and/or inquiry-based learning
- At the high school level, including a career component was also seen as important for attracting participants
- Marin and Solano Counties had the fewer programs that address estuary, watershed, or marine-based education programs than other counties
- Demand for programs does not appear to be decreasing substantially, despite ongoing budget crises in schools and districts

This report presents the findings of the Market Analysis in more detail.

The next step in the process will be to select one of the potential audiences as the primary target audience for the San Francisco Bay NERR's expanded K-16 programming and for a proposed Needs Assessment. The Needs Assessment will help identify the topics, structure, and timing of science education opportunities the target audience is most likely to participate in and benefit from.

Sample and Response Rate

The first step of the research process was a search for estuary, wetlands, and watershed education programs in the San Francisco Bay Areas. As a starting point, we used the *California Regional Environmental Education Community (CREEC)* database to identify informal education and teacher professional development programs. This process yielded a list of over 200 programs; however, it was clear that many of these programs were either not directly relevant or no longer offered. The next step of the process involved searching the internet to make sure the programs were still on offer, and, if so, to collect basic information about the programs. Simultaneously, we used keyword searches on the Internet to find additional programs that were not identified in the database. After this process, we met with the SF Bay NERR to focus the research on those programs and organizations that were most similar or most interesting to NERR's work. At the end of the process, we were left with a list of 72 programs offered by 47 different organizations.

After collecting basic information about the programs, we conducted a survey of providers, asking additional questions about fill rates, recent changes in offerings, and anticipated changes to the programs. The survey was conducted online, and email requests were sent to respondents at all 47 organizations. Organizations that did not respond within the survey period were recruited via reminder emails and telephone calls. In the end, we received responses from 38 out of 47 organizations, for a response rate of 80 percent. This report presents the results of both the web-search data collection and the online survey.

Results

The goals of Market Analysis were to: describe the landscape of estuarine education programs currently available in the SF Bay Area; pinpoint potential challenges that current programs face when offering estuary or watershed education programs; and identify opportunities in the market where the SF Bay NERR is well-poised to develop and offer new programs to teachers, schools, and other organizations.

Current Landscape

Our early investigation of the CREEC dataset, combined with a keyword search of many Internet sites, indicated that there are more than 200 programs that offer education about estuary, watershed, wetlands, or marine topics. Many of these are designed for a public audience and are self-directed, such as tours of nature reserves or sight-seeing voyages. While these programs are often impactful and important, they do not represent the type of program that SF Bay NERR is considering at this time, and, thus, they were removed from the database. In conjunction with SF Bay NERR, we identified 72 programs of interest. This section describes those programs in more detail.

Types of organizations

Of the 47 organizations, most were non-profit institutions. The distribution of types of organizations is presented in the following table. Only one organization is part of the NOAA family.

TABLE 1. PERCENT OF ORGANIZATION BY TYPE

Type	Number of Organizations	Percent (valid) of Organizations
Government	14	32%
Educational	2	5%
Zoos, Aquaria, Museums	9	20%
Other non-profits	19	43%
Missing	3	NA

Continuing Education Credits for Teachers

Nineteen programs were identified as either professional development or programs that were structured for teachers. Of those, 10 offer continuing education credits. The amount of credits offered varies from 1 unit to 3 units. Usually, extra work was required in order to obtain the credits.

Topics covered

Of the 72 programs we identified, only 13 reported that they specifically address estuary education. The distribution of topics is presented in the following table. Note that programs can include more than one topic, so the total is greater than 72 programs.

TABLE 2. PERCENT OF PROGRAMS BY TOPIC

Topic	Number of Programs	Percent of Programs
Estuary	13	18%
Marine	30	41%
Watershed	32	44%
Wetlands	23	32%

Of the 13 projects that include “estuary education” in their program description, eight reported to be exclusively teaching about the estuary, while the other five offered a combination of estuarine and other topics.

Elementary programs most often focus on wetlands, while high school programs more often center around the marine environment.

TABLE 3. TOPICS BY GRADE LEVEL

Grade level	N=	Estuary	Marine	Watershed	Wetlands
Grades K-2	30	15%	42%	23%	50%
Grades 3-5	54	18%	37%	31%	51%
Grades 6-8	42	21%	55%	29%	29%
Grades 9-12	34	16%	61%	23%	29%

Program Fill Rates

Given the current budget constraints that schools and families face, and given the lack of professional development funds available for teachers, it is perhaps not surprising that many programs reported that they were having trouble with recruitment. This finding was, however, not universal, and we used the survey to delve a bit more deeply into trying to understand what programs tended to be filled and what programs were likely to run empty.

Perhaps because they are less common, programs that were directed towards high school students were more likely to fill their available slots than were programs for elementary students. In fact, the higher the grade level audience, the more likely that programs were able to run full. The table below presents the information on percentage of programs in different categories where respondents indicated they were able to completely fill the programs last year.

TABLE 4. FILL RATES BY GRADE LEVEL

Grade level	# programs	Percent of programs with fill rate data reporting full enrollment
Grades K-2	30	42%
Grades 3-5	54	47%
Grades 6-8	42	50%
Grades 9-12	34	56%

Fill rates also varied by program delivery mechanism (e.g., field research versus in-class workshops). Discounting the programs with less than five examples in the dataset, field research and workshops (or professional development sessions for teachers) were most likely to be filled. The field research programs were frequently offered for high school students, which, as noted above, tended to have higher fill rates. Workshops were offered to teachers, most on a year-round basis. Table 4 presents these data below.

TABLE 5. TYPES OF EDUCATION PROGRAMMING, WITH FILL RATES AND TOP FIVE TYPES OF EDUCATIONAL PROGRAMS ABOVE THE LINE

Type of Program	Full	Total	% full
Field trip	16	44	36%
Curriculum	10	29	34%
In-class	7	16	44%
Field research	6	12	50%
Workshop	5	10	50%
Camp	3	9	33%
Service learning	3	7	43%
Internship	2	2	100%
Assembly	1	1	100%

Counties covered

SF-Bay Area NERR was also interested which of the San Francisco Bay counties were covered by the various programs. All nine Bay Area counties were covered, although Marin and Solano Counties, where the San Francisco Bay NERR's Reserve sites are located, had the fewest number of programs. This is perhaps not surprising as they also have two of the lowest overall populations in the region. Most programs did not identify which counties constituted a primary or a secondary audience. One program identified Marin as the sole "primary county" they served, while all others programs said Marin was among the primary counties or a secondary county.

TABLE 6. NUMBER AND PERCENT OF COUNTIES IDENTIFIED AS EITHER PRIMARILY OR SECONARDILY SERVED

County	Number	Percent
Contra Costa	47	65%
Alameda	44	61%
San Francisco	43	60%
San Mateo	37	51%
Santa Clara	35	49%
Sonoma	32	44%
Solano	32	44%
Marin	30	42%
Napa	27	38%

Challenges

Although programs are offered to schools and teachers, this is no guarantee that they will attend. In order to assist SF Bay NERR in designing new programs, we also asked respondents to describe the challenges they face in working with schools and districts. It is

hoped that, by understanding potential challenges, SF Bay NERR can address these potential barriers in their original program design.

Although a number of challenges were identified, three were mentioned more than any others: finding time, transportation, and funding. Fifteen respondents described transportation issues as a major challenge. Sometimes the issues were more broadly related to funding (finding funds to pay for school busses); other times, the challenge was related to time, as transportation to the program site increased the amount of time students were away from the classroom.

Additionally, fifteen respondents indicated that funding was a major challenge. Sometimes the challenges were internal to the organization (e.g., limited funding meant that personnel were over-worked); other times, the challenges were external (e.g., school districts could not pay for professional development for teachers).

Eleven programs indicated that finding time in the curriculum or the school day was a challenge for schools. The increase in the number of standards that schools must address, combined with the emphasis on testing and accountability, means that teachers are hard-pressed to add anything “extra” to the curriculum. Unless they can justify a field trip or lessons as aligned to standards and curricular offerings, they can usually not offer the program to their students.

Changes to Demand for Programs

Despite these challenges, many respondents reported that demand for their programs was increasing. Overall, across all types, 41 percent of programs reported demand has increased over the last two years, while only 17 percent reported that demand decreased. Less than half (although still the modal response at 42 percent) reporting that demand has not changed over the last two years.

Trying to pinpoint where, exactly, demand has been increasing is a bit challenging. Clearly, demand for high school programs is on the increase: 44 percent of respondents reported increased demand for these (and, of that, 22 percent reported “greatly increased” demand), while only 4 percent reported decreased demand (and then on “slightly decreased” demand). This is also true, though less so, for professional development offerings directed at high school teachers: 36 report increased demand, while 14 percent reported decreased demand.

On the other hand, the data for elementary school students is less clear. For example, while 55 percent of respondents report that they have seen increased demand for programs for upper elementary students (one of the highest percentages of reported increase), over 20 percent reported decreased demand – which is one of the highest percentages of reported decrease. When reviewing the program descriptions, location, and mode of delivery, no particular pattern emerges – however, since the number of programs is relatively small, this lack of explanatory pattern is not surprising.

TABLE 7. CHANGES TO DEMAND FOR PROGRAMS BY GRADE LEVEL OF AUDIENCE

Audience	Response N	Increased Demand	No change	Decreased Demand
Students -- Grades K-2		23%	53%	23%
Students -- Grades 3-5		55%	24%	21%
Students -- Grades 6-8		35%	45%	19%
Students -- Grades 9-12		44%	52%	4%
Teachers -- Elementary		50%	32%	18%
Teachers -- Middle School		34%	48%	17%
Teachers -- High School		36%	50%	14%

We also analyzed changes to demand by program type (e.g., field-trip or overnight camp). It is interesting that, despite the fact that many providers report that districts have encountered difficulty obtaining and paying for transportation for students, the demand for field trips appears to be increasing.

TABLE 8. CHANGES TO DEMAND FOR PROGRAMS BY PROGRAM TYPE

Audience	Increased Demand	No change	Decreased Demand
Field Trips	55%	24%	21%
On-site	46%	43%	11%
Camps	42%	42%	16%
Professional Development	29%	54%	17%
Curriculum	32%	39%	29%

As an example of how much demand has fluctuated over the last two years, one program reported:

“We have not been offering additional workshops because a lack of sign ups. We do host workshops that are required for teachers to attend before they bring their class on a field trip – these workshops are full. However, I think that there is more interest lately in additional workshops.”

Opportunities

In order to help identify areas in which SF Bay NERR can augment the current range of estuarine education offerings, we asked programs what they thought attracted participants. In the survey, respondents were asked to identify elements that they felt were important to include for recruitment purposes. The goal was to pinpoint what schools look for in field trip or classroom experience programs and what teachers look for in professional development.

What attracts schools to education programs for students

Hands-on and inquiry-based activities were rated as most important for both K-5 and Grades 6-12 students. For younger grades, including state education standards in the program was also considered an important component.

TABLE 9. PROGRAM ELEMENT BY PERCEIVED IMPORTANCE (GRADES K-5)

Element	% Very important	% Somewhat + % very important
Hands-on activities	84%	100%
Inquiry-based activities	66%	84%
Alignment to California state standards	58%	79%
Ongoing support	29%	66%
Problem or project-based activities	26%	61%
Materials that can be used over again	26%	50%
Service Learning activities	21%	50%
Social or political component	8%	40%
Career-oriented activities	8%	32%

For high school programs career-oriented activities were also rated with overall relatively high importance, although only one-quarter rated these as “very important.” Service learning ranked high as well, perhaps because many local area high schools require service learning credits prior to graduation.

TABLE 10. PROGRAM ELEMENT BY PERCEIVED IMPORTANCE (GRADES 6-12)

Element (Grades 6-12)	% Very important	% Somewhat + % very important
Inquiry-based activities	66%	71%
Hands-on activities	63%	71%
Career-oriented activities	26%	58%
Service Learning activities	34%	58%
Alignment to California state standards	42%	55%
Problem or project-based activities	29%	55%
Social or political component	13%	45%
Ongoing support	24%	45%
Materials that can be used over again	18%	40%

What attracts teachers to professional development courses

We asked program developers their perception of what program elements were important to teachers. Program identified two main drivers: some teachers signed up because of their desire to learn more science content while others signed up because of their general interest in science.

TABLE 11. REASONS TEACHERS ARE ATTRACTED TO COURSES

Program Element	% Very important	% Somewhat + % very important
Teacher's need to learn more science content	37%	55%
Teacher's general interest in science	34%	55%
Stipend offered	24%	48%
Continuing education credits offered	16%	45%
Ongoing support included as part of professional development	24%	45%
Professional development required before teacher can bring students on field trip	13%	29%

Potential changes to program offerings

In addition to exploring the current offerings, we also asked respondents to describe new programs they planned to create. The wide range of responses seems to indicate that different organizations have identified very different opportunities to develop new programs or expand their current programs. Nine organizations indicated no plans to develop new programs or expand their existing programs. An additional six organizations report plans to focusing on expanding or improving their existing programs instead of creating new ones.

Of the new programs planned, they range from offerings for preschool age children, through elementary, high school, and college, to job training programs for transition aged youth. Five organizations planned to develop programs for high-schools: three of these involve internships/apprenticeships/mentoring.

Content area, when discussed, also varies widely. Two organizations plan to develop climate change education programs, but other topics include: biodiversity, bio-mimicry, birds, and pollution.

TABLE 12. TOP FIVE TOPICS THAT NEED MORE ATTENTION

Topic
Climate Change
Biodiversity
Bio-mimicry
Birds
Pollution

What emerges from this analysis is that the field does not seem to have identified specific gaps in the current range of offerings. We might expect that, if, for example, high school programs were widely missing, or if teachers were asking for climate change education in large numbers, that the field would be responding appropriately. Instead, we find a wide

range of new offerings, and a fairly large segment that is not planning to develop new programs.

Teaching other organizations about estuaries

Finally, at the request of SF Bay NERR, we asked organizations if they would be interested in receiving, at no cost, a tailored program to teach their staff about estuarine science and/or current research about the San Francisco Bay. Over half of respondents said they would be “very interested” and another quarter indicated they would be “some-what interested.”

Recommendations

- Many **elementary teachers** are under pressure to improve their ability to teach science. For this reason, although professional development funds may be more limited now than they were in the past, programs that provide training for in-service elementary teachers appear to be increasingly in demand: according to our study, 50 percent show an increase in demand for training. Programs that help teachers develop or learn to implement hands-on, inquiry-based programs, with minimal preparation and ongoing support. It would be worth pursuing a line of questioning, during the Needs Assessment, with elementary teachers, to find out in more detail what types of professional development they feel they need.
- Schools still seek out high-quality experiences for their **high school students**. Programs that include hands-on field work and a career component appear to be in the greatest demand. Teachers and districts would be able to provide more information on what they would need in a program for high school students.
- Although providers appear to be developing new programs that cover a wide range of topics, programs with an **environmental or social component** (such as those based on climate change education) appear to be most on the increase.

Given the warm response to SF Bay NERR’s proposal to offer **educational programs to the staff** of local estuary, wetlands, watershed, and marine education providers, it would be worthwhile to pursue this in more detail.

Appendix A: Responses to Open-Ended Items

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Below are transcriptions of all comments that respondents made to the survey. These are categorized by theme. Responses that address more than one theme are split so that they can be included with the relevant theme. Thus, individual bullet points represent individual ideas, not necessarily different respondents.

What new programs do you hope to develop in future years? How soon will you offer these programs?

Programs for preschool-age children

- We hope to develop better preschool offerings.

Programs for elementary students

- We just began our 4th grade history program during the 2010/2011 school year. We had five classes register within a week of announcing the program.
- Farallon Island research-based elementary program with the next year

Programs for high school students

- High School Internship program within the next 2 years;
- Apprenticeship programs for high school students;
- Climate change programs for High school
- Ecosystem surveys for high school students. Unsure when they will be available.
- Mentorship programs with older students training younger students in watershed/wetland ecology and issues and salt marsh restoration techniques;
-

Programs for college students

- We would like to more fully develop an intern program that will allow college students and other participate with [our program] and learn our model, and teach us what they know.

Formal education – no specific age-range

- We are looking into the possibility of partnering with local schools to offer more curriculum units that engage students both in the classroom as well as out in nature.
- We hope to develop more classes that cover earth & physical sciences. The plan is to start to roll out new classes between the 2011/12 school year.
- We have been piloting our a habitat restoration education program and we hope to offer it to more schools in the future.

Onsite programs for general public

- We hope to develop a more general program for summer groups about what [our organization] does.
- On site education trails; additional natural history subjects
- We are just starting a new development project for educational activities and displays associated with our new headquarters which will be located in the [nature reserve]. These programs will begin when the building opens in 12-24 months.

Informal Education Programs – no specific age-range

- Offering weekend field trips for students and their families. We will offer a few pilot program dates this spring and summer 2011.
- Jr. Rangers program. Sometime this year.
- We are also planning a pilot for a bird-focused summer camp beginning this summer.

Job-training (including volunteer) programs

- Multiple programs over the course of a few restoration seasons to promote skilled stewards;
- [We hope] to start a transitional-aged youth program and expand our current native plant nursery. The transitional-aged youth would be getting on the job job training and employment opportunities through our native plant nursery and maintenance of restoration projects. This is the plan for the next fiscal year. [We also hope to] expand our currently existing environmental education program, volunteer days, and collaborative programming with other organizations.

Teacher trainings

- Teacher trainings aligned with each restoration season for teachers participating in our programs.
- Climate change focused teacher professional development programs - 2011
- We are developing a training for educators utilizing our [currently developed guidebook]. These pilot trainings will be implemented in the summer. They focus on watershed education for middle and high school teachers and non-formal educators.
- Webinars focused on science pedagogy and effective instructional strategies. Pursuing grants to support webinars and face to face PD.
- Pending funding, we hope to develop a program to support midcareer teachers (with 3 to 5 years experience), we also plan to develop more programming in watershed education
- [We] have just expanded our elementary teacher institutes to a national audience and made them residential.
- We also hope to expand some of institutes to be multi-year programs that visit other watersheds than [our location] in subsequent years.

Active programs

- Restored wetlands exploration/study via kayaks/canoes
- Bicycling, hiking

New content areas – no details

- Biomimicry We are offering this program this year.
- We will be introducing a new plastics pollution/marine debris institute in 2012.

New field trips

- Programs are constantly being generated to expand our educational horizons. Every year we get a few new teacher requests. At the end of each school year all the requests for the prior year are tallied and the outcome of will determine what new programs will be created and what existing programs will to be expanded. This past year I have been getting requests for onsite wetland field trips. I am currently working closely with representatives [of other nature reserves] on safety issues and will implement a variety of environmental programs and hikes as soon as I get the blessings from the powers that be.

Changing or expanding existing programs

- We are expanding our Eco-Education Programs from Oakland and Richmond to San Francisco in the coming year.
- We'd like to enhance existing programs with technology-support including web-posted- student-generated projects, GPS programs, live-feed cameras from the field. It's planned to begin piloting or implementing these programs in the next 5-10 years.
- data sharing- current development web based resources- next year
- I don't think we'll be offering any completely new programs: we're building upon, strengthening, and enhancing the scientific credibility of our current programs. We're launching new 5-unit curricula for both our programs, and we'll be piloting them and using teacher and student evaluations to strengthen them. We've just recently launched new online data entry and graphing systems for both our programs as well, so we'll be evaluating the effectiveness of those.
- We want to expand the current programs.
- We hope to align our programs closer to grade level science standards.

No new programs planned

- We do not have plans to offer new programs at this time due to our small budget for staff.
- Our programs have been developed over several years to match our resources and the state curriculum standards; no additional programs are being developed except in social media.
- The newest program was launched this last fall and is still trying to generate interest.
- These two programs are new as of 2010, and are still under development. We are offering them to approximately twice the number of schools this year as last.
- Currently unknown.
- It depends on the results of this survey!
- [We do] not plan on expanding [our] educational program in the next several years
- We don't plan to offer any additional programs.
- N/A

What challenges have you encountered in offering estuary, wetlands, or watershed education programs?

Transportation

- Transportation to field sites
- Challenges to offering our field trips is transportation, getting school groups out to [parks in our region], even the ones who are in the neighborhood.
- Transportation costs for the schools, field trip cutbacks, larger class sizes
- Mostly funding for bussing to and from field trip locations.
- We like to encourage our teachers to get kids outside. Transportation [is a barrier] to this.
- Field trips are very important and it is always at least a little challenging for teachers, especially in underserved schools to obtain bus transportation
- Something that is mentioned regularly by teachers is ... transportation to the sites.

- Our program is free of cost and a few of our main restoration sites are near public transit lines so we are able to make it feasible for schools to come out with us even during very difficult times.
- Our biggest obstacles are ... transportation to our more remote and obscure sites ...
- Transportation to field trip sites is obviously a huge challenge. In order to save costs, we have used public transportation which has its many pros and cons. The biggest setback being that travel time often takes away precious learning time at the actual field trip site!
- Transportation issue for teachers - either the cost, lack of available parent drivers, or lack of required insurance for drivers.
- Transportation is sometimes a problem as well.
- Right now, our biggest challenges is the cost of bus transportation to the field trip site and finding enough chaperones to make the field trip happen. Those are the top two reasons teachers cancel a field trip or are unable to schedule a trip in the first place.
- Transportation costs to allow students to visit multiple points along the watershed.

Adverse impact on resources

- Schools have large classrooms or class sizes that when investigating could adversely impact the marsh.
- We have a fishing activity using a seine so we must be careful not to fish too often and not to fish at very low tides; we do not want to negatively impact the resource. It is often difficult to schedule our field trips around the changing tides!
- Trying to ensure our small intertidal study area isn't decimated by overuse.

Working in a natural environment

- Bad weather
- Our biggest obstacles are weather related challenges...
- Working within the constraints of the low-tides and school day length to be able to offer enough program spaces for the demand.

Unknown

- New at park still learning what programs we have and don't have and what challenges have been for the programs we do have.

Standards/Assessment/Structural

- Not in the standards, overcrowded curriculum with little room for science at all, schools have no money to spend on professional development around science. Most of these programs must be grant-funded and grants are getting more and more competitive and narrow as the money for science shrinks.
- Competing with classroom time for mandated District Wide curriculum.
- Updating curriculum materials.
- Offering a wide variety of classroom activities that truly match the standards in all the different science content areas.
- The main challenge we have encountered is that teachers don't necessarily see this topic as well aligned with the state standards.
- Also, something that is mentioned regularly by teachers is finding the time in their curriculum ... and needing the ability to justify the education program to the administration.

- We would like to make our program a required part of middle and high school science/ enviro science/ service learning curriculum.
- Increased pressure to cut out hands-on science programs due to increased focus on Elementary School STAR test scores, Language Arts and Math. Many teachers seem to feel like they are already stretched to do what they are expected to do without another program that could be perceived as something "extra."
- Support from public school administrators is a huge challenge since they are often concerned that implementing any outside curricula will distract their teachers away from achieving benchmarks in language arts and math. They must be convinced that environmental education, in general, can be multi-disciplinary and not just science-based.
- The tight scheduling of middle school and high school is problematic as well-- with less 6-12th grade students able to participate if restorations aren't close to the school site.
- Hard for middle and high school students to leave school for multi-day experiences

Funding/Personnel

- Funding and personnel to operate the programs.
- Also, we have limited staff capacity to develop a long-term collaboration with teachers beyond the one-time field trips. The challenge of incorporating wetlands/watershed education into schools more intensely requires that we have staff to develop and build those relationships in a culturally competent way that are relevant to the students.
- We like to encourage our teachers to get kids outside. Time, transportation, and field equipment are barriers to this.
- Not many, when the program is free, but our latest is a bit more difficult due to the cost factor
- While it's not specific to the topic of estuaries or watersheds, our biggest challenge has been teachers being unable to pay for our programs due to the funding cuts at their schools.
- Funding
- Funding remains the biggest challenge. We don't charge teachers or landowners so need to find the resources to keep going.
- Lack of stable funding for staff.
- Also, internally, budget issues preventing staff from putting in the necessary research time.
- The only true challenges are -- monetary challenges.
- Offering programs at a price schools can afford.
- Funding or the abilities of schools to pay for them.
- Getting more economically disadvantaged schools to participate: many schools don't have the funds to bring classes out to the coast to monitor; our bus scholarships cover up to \$500 of reimbursed traveling only.
- Curricular development that allows for minimal staffing
- high quality curriculum,

Location

- Demand is always greater near the coast for our teacher programs. Usually, the only time we have any problem filling workshops is when we reach farther inland.

- The biggest challenge we have is finding a location where we can take the children to really experience the watershed. With the changing tides, and limited options, there are few places available.
- Limited access to watershed areas; our area is used for education on marine mammals and indigenous peoples; very few requests for other topics.
- Boat access

Recruitment/Filling slots

- Marketing our programs to schools with very little marketing budget. Schools are not signing up for our programs as quickly now that we are not as new, and perhaps because they do not have funds available for field trips or on-site extra activities.
- Our biggest obstacles are ... many schools/districts simply don't approve many field trip opportunities so schools are unable to bring the same class out for multiple trips.

Communication with schools

- Field trip application process with teachers and administrators is often challenging. Outside educators must familiarize themselves with all the necessary protocol and procedures in order to ensure a timely and well-planned field trip.
- Planning/communication with teachers, in general, can be very challenging since teachers are often inundated with their own curricula. Cell phones, email, texting, visiting schools: some teachers respond in different ways and on their own time. It may be in the best interest of the outside educator and the participating teachers to agree on the most effective means of communication and stick to it!
- Working with the school year calendar getting good information

Connecting with students (cultural competence and perception of relevance)

- Connecting students limited classroom learning on the subject to what we're seeing on a field trip. More background knowledge and vocabulary would be beneficial.
- Have heard from teachers that most environmental education programs do not have a high level of cultural competence in working with a broader diversity of audiences
- Lack of focus on transference of knowledge/relevance to students' everyday lives
- Our goal is to always make the topic relevant to the children and youth that we serve. We try to get to know our audience.
- We strive to make wetland/watershed education relevant to the low-income community next to the open spaces we steward, so it's a challenge to find funding and develop programs that connect to the community in ways that they find relevant, such as stewardship and improvement of open spaces, economic development, and urban planning/redevelopment.

None

- Satisfying demand - our entire year of programs is normally booked in a matter of days. Teachers complain about not being able to book.
- Our watershed-wetland educational programs are quite successful considering that they are mostly conducted indoors. Being indoors is also the biggest challenge and the driving force behind the push to get students out to the site

- for first-hand experiences. [Our restoration project] is the largest wetland restoration project in the State of California. Meanwhile, every local outdoor environmental event is used as an opportunity to promote [our] project and cultivate public interest and awareness in the fascinating subject of wetlands (hands-on activities are available for demonstrations).
- None in [our marsh] area. Schools use that regularly for side education.

What other important components encourage teachers to sign up their students for your programs?

Content

- Alignment to standards.
- All programs emphasize the importance of conservation, preservation and stewardship.
- Authentic science experience where the data students collect actually is used (by national marine sanctuaries): helps the students see the monitoring as more than just a field trip.
- Easy to use curriculum
- Educational programs are constructed into modules so that each component has a beginning and end and information can be arranged in a chronological order or can be spontaneously rearranged based on student interest and questions.
- Interaction w/Live animals
- We align our curriculum not only with the CA state standards, but also the Ocean Literacy Principles.

Structure

- Student to museum educator ratio is small.
- Teachers/administrators serve as partners on these projects and agreed to have their students and teachers participate because the offerings were tailored to their school and provided them with opportunities to get science that they wouldn't otherwise have, such as putting on a summer school focused on science, and providing opportunities to interact with grad students.
- We make it very easy to participate in our program (support, flexibility in scheduling, providing bus scholarships to bring students out to the coast, etc.)

Cost, transportation and logistics

- [A corporate sponsor] underwrites tours [at our site] to provide free programs schools.
- Admission and parking is free with plenty of room for buses.
- Availability of busing or transportation,
- Cost
- Free program due to lack of funding
- Funding/sponsorship
- Money
- Programs are no cost.
- Programs that are grant-funded do not have the same issues that a program often has if the school has to put resources towards it.
- Reimbursement for bus transportation.
- Stipends and transportation funding

- Transportation - we have a relationship with Department of Environment in which DOE provides school buses and substitute teacher funding to bus schools to our site.
- Transportation funding for buses and drivers. This way, teachers don't have to persuade school administration the program is worthwhile as a major cost is defrayed.
- Whether teachers can obtain subs

Quality

- We have an excellent reputation.

Other

- Teachers don't sign up their students for our programs directly - teachers may tell their students about these opportunities and encourage them to sign up or the students are provided learning opportunities as their teachers participate in PD.

What other important components encourage teachers to sign up for your professional development offerings?

Content

- A menu of options.
- Field experiences, working with scientists and experts, free materials and supplies, professional networking, that the program is hands-on, that they are treated like professionals, they know that they will get behind the scenes for an indepth look at [our site]
- The PD needs to be directly applicable to what they are teaching - their standards and adopted curriculum, and address the needs of the student population. Literacy integration with science fills a need they have. We are looking forward to the standards changing so that more science and especially ocean/wetland science has a presence and teachers are once again able to teach it.
- Tying activities to state science standards at appropriate grade level.

Cost/Incentives

- Money
- Provide decent food. (take care of them)
- Providing low-cost, hands-on activities teachers can use with their students.

Quality

- High quality programs.
- Our excellent reputation among teachers.

Appendix B: Survey Instruments

National Estuarine Research Reserve Market Analysis Survey

Introduction

As part of a national effort, the San Francisco Bay National Estuarine Research Reserve is conducting a two-part analysis of the professional development opportunities for teachers and education offerings to schools around estuaries and watersheds. The goal is to identify potential gaps in the local professional development and education markets, to help SF Bay-NERR as they create new programs.

You, along with many of your colleagues, are being asked to take this brief survey, to help understand what is currently offered to teachers and schools. The information we collect will be used to ensure that we do not replicate previously existing programs. In addition, the results of this study will be made public, and we'd be happy to share it with you.

Your answers will be kept as confidential as possible. The survey collection and analysis is being conducted by the Lawrence Hall of Science, UC Berkeley. When we report out, we will not identify specific programs or respondents by name.

If you have any questions about the work of the San Francisco Bay National Estuarine Research Reserve, feel free to contact Sarah Ferner at daviess@sfsu.edu.

The survey should take about 10 minutes. We appreciate your response!

Programs Offered

1.) We will ask about programs you have for teachers and students in K12. We are particularly interested in programs that focus on estuaries and watersheds.

Please list up to 10 programs with which you are currently involved in the spaces below. Some of the spaces have already been filled out for you. You may edit or remove any of the pre-filled text.

2.) Please tell us about the counties you serve. Which county or counties do you primarily serve? Are there additional counties that you reach?

	Primary county/ies	Other county/ies served
Alameda	<input type="checkbox"/>	<input type="checkbox"/>
Contra Costa	<input type="checkbox"/>	<input type="checkbox"/>
Marin	<input type="checkbox"/>	<input type="checkbox"/>
Napa	<input type="checkbox"/>	<input type="checkbox"/>
San Francisco	<input type="checkbox"/>	<input type="checkbox"/>
San Mateo	<input type="checkbox"/>	<input type="checkbox"/>
Santa Clara	<input type="checkbox"/>	<input type="checkbox"/>
Solano	<input type="checkbox"/>	<input type="checkbox"/>
Sonoma	<input type="checkbox"/>	<input type="checkbox"/>

3.) What was your typical fill rate for these programs last year (Sept 2009-Aug 2010)?

	Program was canceled due to low enrollment	Less than 50% full	Between 50% and 74%	Between 75% and 99%	Program was full
Program 1					
Program 2					
Etc.					

4.) Some colleagues report that demand for their programs has changed in recent years. Can you tell us how demand has changed, if at all, for the following audiences or groups. Programs offered for ...

	Greatly increased demand	Slightly increased demand	No change	Slightly decreased demand	Greatly decreased demand
Early elementary (K-2) students	()	()	()	()	()
Upper elementary (Gr 3-5) students	()	()	()	()	()
Middle school (Gr 6-8) students	()	()	()	()	()
High school students	()	()	()	()	()
Elementary school teachers	()	()	()	()	()
Middle school teachers	()	()	()	()	()
High school teachers	()	()	()	()	()

5.) Some colleagues report that demand has for their programs have changed in recent years. Can you tell us how demand has changed, if at all, for the following types of programs.

	Greatly increased demand	Slightly increased demand	No change	Slightly decreased demand	Greatly decreased demand	Varies too much to say
Field trips	()	()	()	()	()	()
Programs offered at school sites (e.g., assemblies or classroom presentations)	()	()	()	()	()	()
Overnight camps	()	()	()	()	()	()
Professional development that crosses multiple years	()	()	()	()	()	()
Curricular materials and/or lesson plans	()	()	()	()	()	()

6.) For programs directed towards elementary (K-5) students and schools, what helps a program appeal to teachers and schools? [same question for Grades 6-12].

	Very important	Somewhat important	A little important	Not important at all
Alignment to California state standards	()	()	()	()
Materials that can be used over again	()	()	()	()
Ongoing support	()	()	()	()
Hands-on activities	()	()	()	()
Inquiry-based activities	()	()	()	()
Career-oriented activities	()	()	()	()
Problem or project-based activities	()	()	()	()
Service learning activities	()	()	()	()
Social or political component	()	()	()	()

7.) What other important components encourage teachers to sign up their students for your programs?

8.) We also want to understand what teachers look for in professional development courses. In your opinion, how important is each of the following?

	Very important	Somewhat important	A little important	Not important at all
Continuing education credits offered	()	()	()	()
Stipend offered	()	()	()	()
Ongoing support included as part of professional development	()	()	()	()
Teacher's general interest in science	()	()	()	()
Teacher's need to learn more science content	()	()	()	()
Professional development required before teacher can bring students on field trip	()	()	()	()

9.) What other important components encourage teachers to sign up for your professional development offerings?

Reflections

10.) What new programs do you hope to develop in future years? How soon will you offer these programs?

11.) What challenges have you encountered in offering estuary, wetlands, or watershed education programs?

12.) With what other organizations do you suggest we talk about estuary, wetlands, or watershed education programs?

13.) What challenges have you encountered in offering estuarine or watershed education programs?

14.) What other organizations do you suggest we should talk to about estuarine education programs?

15.) Would you be interested in having an educator from the National Estuarine Research Reserve provide a tailored program to teach your staff about estuarine science and/or current research about the San Francisco Bay (free of charge)?

Please rate your level of interest on a scale of 1 to 4, with 4 = Very Interested and 1 = Not Interested At All.

14.) Any Comments?

Thank you for taking our survey; your response is very important to us.