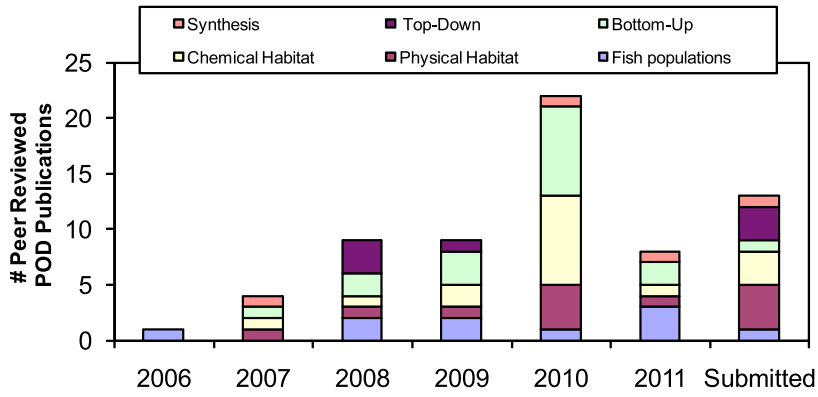
Interagency Ecological Program
Peer-Reviewed Publications in 2010 and 2011
Status: 6-15-2011

This is an updated list of IEP publications for calendar years 2010 and 2011 with **key points** and **complete citations.** This list includes publications recently published in or submitted to peer-reviewed scientific journals. Publications resulting from work described in the Pelagic Organism Decline workplans ("POD publications") are marked with an asterisk (*). Publications using IEP data, but not resulting from work associated with IEP study elements, are listed separately at the end of this publications list.

The number of peer-reviewed POD publications is steadily increasing and covers a broad range of topics. The topics in this graphic represent the main components of the basic POD conceptual model.



Published or in press, by general IEP topic:

(30 papers in 2010 and 8 papers to date in 2011)

Fish:

* Three decades of IEP monitoring show that abundances of marine bottom-dwelling fishes, crabs and shrimp in San Francisco Estuary track major climate (and resulting ocean circulation) patterns in the Pacific Ocean. Although the linkage mechanisms are not known for all the species, ocean climate indices represent meaningful indicators of ecological variability in the San Francisco Estuary. However, ocean climate does not explain variability of pelagic fish populations in the estuary, including the Delta. *(NCEAS paper)*

Cloern, James E., Kathryn A. Hieb, Teresa Jacobson, Bruno Sansó, Emanuele Di Lorenzo, Mark T. Stacey, John L Largier, Wendy Meiring, William T. Peterson, Thomas M. Powell, Monika Winder, and Alan D. Jassby. 2010. Biological Communities in San Francisco Bay Track a North Pacific Climate Shift. Geophysical Letters 37, L21602, DOI 10.1029/2010GL044774. http://www.agu.org/pubs/crossref/2010/2010GL044774.shtml

* Modeling results suggest large decreases in suitable habitat area for delta smelt in all but dry years from simulated future water demand increases, an effect which is exacerbated by all but one of the five climate change scenarios we examined.

Feyrer, F., M. Nobriga, T. Sommer, and K. Newman. 2010. Modeling the effects of future freshwater flow on the abiotic habitat of an imperiled estuarine fish. Estuaries and Coasts. Published online 28 September 2010, DOI 10.1007/s12237-010-9343-9 http://www.water.ca.gov/aes/docs/FeyrerNewmanNobrigaSommer2010.pdf See also http://www.erf.org/cesn/november-2010#article2

It appears that while most splittail successfully spawn and rear in freshwater, some successful recruitment occurs in elevated salinity in the Napa and Petaluma Rivers.

Feyrer, Frederick, Hobbs, James, & Sommer, Ted. (2010). Salinity Inhabited by Age-0 Splittail (Pogonichthys macrolepidotus) as Determined by Direct Field Observation and Retrospective Analyses with Otolith Chemistry. San Francisco Estuary and Watershed Science, 8(2). Retrieved from: http://escholarship.org/uc/item/14j5160h

This study found that juvenile Chinook salmon grow faster and accumulate more methylmercury in the Yolo Bypass than in the Sacramento River. Methylmercury accumulation patterns depended on the dominant source of Yolo Bypass flood water (Sacramento River or Cache Slough).

Henery, R. E., T. R. Sommer, and C. R. Goldman. 2010. Growth and Methylmercury Accumulation in Juvenile Chinook Salmon in the Sacramento River and Its Floodplain, the Yolo Bypass. Transactions of the American Fisheries Society 139:550–563 http://www.water.ca.gov/aes/docs/YoloSalmonMercury.pdf

* Results from this study indicate that low salinity habitats function as important nursery areas for longfin smelt. Juvenile longfin smelt are also caught at higher salinity levels, but do not survive to adulthood under these conditions. This discrepancy between survival in low versus high salinity habitat is particularly apparent in the POD years following the longfin smelt population decline.

Hobbs, J.A., L. L Lewis, N. Ikemiyagi, T. Sommer and R. Baxter. 2010. Identifying critical nursery habitat for an estuarine fish with otolith strontium isotopes. Environmental Biology of Fishes. 89:557-569. DOI 10.1007/s10641-010-9762-3. http://www.water.ca.gov/aes/docs/HobbsLongfin2010.pdf

* This study developed the genetic tools for evaluating population differentiation in coastal collections of longfin smelt from the San Francisco Bay-Delta, CA and Lake Washington, WA. The fish were surveyed for genetic diversity and appeared to form distinct populations. Further sampling is continuing and will use these genetic tools to evaluate the population structure of longfin smelt along the west coast.

Israel, J.A., B. May. 2010. Characterization and evaluation of polymorphic microsatellite markers in the anadromous fish *Spirinchus thaleichthys*. Conservation Genetics Resources 2: 227-230. http://www.springerlink.com/content/px67r50j24wx7130/

* Multivariate autoregressive (MAR) modeling confirmed that 28 of 54 proposed relationships between the four POD fish species and abiotic and biological factors play a role in driving the POD fish abundance trends. Important factors affecting multiple POD fish species include the position of the 2 ‰ isohaline (X2) and water clarity. Food web factors were somewhat important. *(NCEAS paper)*

Mac Nally, Ralph, James R. Thomson, Wim J. Kimmerer, Frederick Feyrer, Ken B. Newman, Andy Sih, William A. Bennett, Larry Brown, Erica Fleishman, Steven D. Culberson, and Gonzalo Castillo. 2010. An analysis of pelagic species decline in the upper San Francisco Estuary using Multivariate Autoregressive modeling (MAR). Ecological Applications, 20: 167-180. http://www.esajournals.org/doi/abs/10.1890/09-1724.1

Statistical analysis of the survival of 15 groups of juvenile Chinook salmon released in the Sacramento River and in the interior Delta showed much lower survival for the salmon released in the interior Delta. The effects of exports on salmon survival could not be conclusively determined with the available data.

Newman, Ken B. and P. L. Brandes. 2010. Hierarchical Modeling of Juvenile Chinook Salmon Survival as a Function of Sacramento–San Joaquin Delta Water Exports. North American Journal of Fisheries Management 30:157–169. http://cat.inist.fr/?aModele=afficheN&cpsidt=22478320

* This paper provides a general framework for assessing the potential utility of the otolith Sr/Ca ratio in estuarine systems and specifically for the San Francisco Estuary. For adult striped bass, the Sr/Ca ratio can help discern when the bass entered the estuary, but provides little to no information about bass use of higher salinity habitats.

Phillis, Corey C., David J. Ostrach, B. Lynn Ingram, Peter K. Weber. 2011. Evaluating otolith Sr/Ca as a tool for reconstructing estuarine habitat use. Canadian Journal of Fisheries and Aquatic Sciences, 2011, 68:360-373, 10.1139/F10-152 http://www.nrcresearchpress.com/doi/abs/10.1139/F10-152

* Analysis of historical data revealed that part of the decline in age-0 striped bass has been due to a distribution shift away from the channels sampled by midwater trawls. This conclusion is supported by modeling of demographic patterns, which showed that abundance of older (age-1) fish was higher than expected based on the modest numbers of age-0 fish captured in the trawls. The authors hypothesize that reduced food availability in pelagic habitat is a major cause of apparent behavioral shifts in age-0

striped bass and some native fishes. Nonetheless, the magnitude of the shift towards shoal habitat does not appear to fully account for the extreme decline in age-0 striped bass abundance.

Sommer, Ted R, Francine Mejia, Kathy Hieb, Randy Baxter, Erik J Loboschefsky and Frank J Loge. 2011. Long-term shifts in the lateral distribution of age-0 striped bass *Morone saxatilis* in the San Francisco estuary. In press. Transactions of the American Fisheries Society.

* Delta smelt migrate relatively quickly following the first major rains of the year. Most do not spawn immediately after migrating. Some delta smelt may not migrate at all - they may stay in upstream habitat such as Cache Slough.

Sommer, T., M. Nobriga, L. Grimaldo, F. Feyrer, and F. Mejia. 2011. The Spawning Migration of Delta Smelt in the Upper San Francisco Estuary. In press. San Francisco Estuary and Watershed Science.

* Bayesian change-point models revealed step declines in abundances of all four POD fish species in the early 2000s, with a likely common decline in 2002. Water clarity, position of the 2 ‰ isohaline (X2) and water exports predicted some variation in species' abundances over time, but no selected covariates could explain statistically the post-2000 change-points for any species. *(NCEAS paper)*

Thomson, J.R., W. J. Kimmerer, L. R. Brown, K. B. Newman, R. Mac Nally, W. A. Bennett, F. Feyrer, E. Fleishman. 2010. Bayesian change-point analysis of abundance trends for pelagic fishes in the upper San Francisco Estuary. Ecological Applications, 20: 181-198. http://www.esajournals.org/doi/abs/10.1890/09-0998.1?journalCode=ecap

Food web:

* This study developed a genetic technique for quickly identifying *Microcystis* toxicity and determined that *Microcystis* toxicity is spatially and temporally variable. Elevated toxicity was common in the western Delta near Antioch. This was unexpected and may indicate the presence of a salinity tolerant strain in this region. This is the same area where elevated microcystin levels and biomarker scores for juvenile striped bass were found.

Baxa, D. V., T. Kurobe, K. A. Ger, P. W. Lehman and S. J. Teh. 2010. Estimating the abundance of toxic *Microcystis* in the San Francisco Estuary using quantitative real-time PCR. Harmful Algae 9: 342349. http://www.water.ca.gov/ssr/docs/Baxa2010_HarmfulAlgae.pdf

* This laboratory feeding study determined that dietary *Microcystis* is toxic to Medaka fish and has a more adverse impact on male fish. Results suggest that long-term exposure to microcystins in the Delta may be a health problem for fish.

D. Deng, K. Zheng, F. Teh, P. W. Lehman, S. J. Teh. 2010. Toxic Threshold of Dietary Microcystin (-LR) for Quart Medaka. Toxicon 55: 787794. http://www.water.ca.gov/ssr/docs/toxic_threshold_of_mc.pdf

* *Microcystis* is toxic to Delta copepods even when it is a small proportion of an otherwise highly nutritious diet. Dietary toxicity was not due to microcystins, but to other, unknown metabolites common in *Microcystis*. Thus, the density and persistence of

Microcystis blooms may be more important to copepods than the microcystin concentration. Some copepods (e.g. *P. forbesi*) can tolerate dietary *Microcystis* better than others (e.g. *E. affinis*), as long as there is other adequate nutritious food available.

Ger, Kemal A. Swee J. Teh, Dolores V. Baxa, Sarah Lesmeister, and Charles R. Goldman. 2010. The effects of dietary *Microcystis aeruginosa* and microcystin on the copepods of the upper San Francisco Estuary. Freshwater Biology 55:1548-1559.http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2427.2009.02367.x/abstract

* Copepods in the Delta showed large differences in their ingestion of *Microcystis* cells under laboratory conditions. *Pseudodiaptomus forbesi* ingested an order of magnitude less than *Eurytemora affinis*, suggesting it is able to tolerate *Microcystis* via more efficient selective feeding on alternative food. It also appears that selective feeding by *P. forbesi* becomes more pronounced during long-term exposure to different *Microcystis* strains during blooms.

Ger, Kemal Ali, Patty Arneson, Charles R. Goldman, Swee J. Teh. 2010. Species specific differences in the ingestion of Microcystis cells by the calanoid copepods *Eurytemora affinis* and *Pseudodiaptomus forbesi*. Journal of Plankton Research 32 (10): 1479-1484. http://plankt.oxfordjournals.org/content/32/10/1479.short

* The highly abundant copepod *Limnoithona tetraspina* has a low growth and reproductive rate and is almost always food-limited in the estuary. Its high abundance must be achieved through low mortality, consistent with low rates of predation by the dominant planktivorous fish species such as delta smelt which feed visually.

Gould, A.L. and W.J. Kimmerer. 2010. Development, growth, and reproduction of the cyclopoid copepod *Limnoithona tetraspina* in the upper San Francisco Estuary. Marine Ecology Progress Series 412: 163-177. http://www.int-res.com/abstracts/meps/v412/p163-177/

* Microzooplankton are an essential link in the estuarine foodweb, but they have never been monitored in the Bay-Delta and seldom studied. This paper shows high grazing impact by the overbite clam (*Corbula amurensis*) on microzooplankton, and that microzooplankton can survive in the upper estuary only through subsidies from other regions less affected by the clams.

Greene, V.E., L. J. Sullivan, J. K. Thompson, and W.J. Kimmerer. 2011. Grazing impact of an invasive clam, *Corbula amurensis*, on the microzooplankton assemblage of the Northern San Francisco Estuary. Marine Ecology Progress Series. doi: 10.3354/meps09099 http://www.int-res.com/prepress/m09099.html

* A new statistical method was developed for analyzing the development times of copepods in laboratory culture experiments. These experiments are used to estimate growth and mortality rates in field populations, and are therefore central to studies of population dynamics.

Kimmerer, W.J. and A.L. Gould. 2010. A Bayesian approach to estimating copepod development times from stage frequency data. Limnology and Oceanography Methods 8:118-126. http://userwww.sfsu.edu/~kimmerer/Files/KimmererGould2010LOMethods.pdf

* *Microcystis* may contribute to changes in phytoplankton, zooplankton and fish populations in the Delta.

Lehman, P. W., S. Teh, G. L. Boyer, M. Nobriga, E. Bass and C. Hogle. 2010. Initial impacts of *Microcystis* on the aquatic food web in the San Francisco Estuary. Hydrobiologia 637: 229-248. http://escholarship.org/uc/item/5s19r1hz;jsessionid=3CD204171E68883A1C4B02073070900C

* The primary factor controlling flux of materials in Liberty Island is tidal. Tidal flux may be the primary way freshwater wetlands contribute to fishery production.

Lehman, P. W., S. Mayr, L. Mecum and C. Enright. 2010. The freshwater tidal wetland Liberty Island, CA was both a source and sink of inorganic and organic material to the San Francisco Estuary. Aquatic Ecology 44:359–372. http://www.springerlink.com/content/n4617315633702x0/fulltext.pdf

* This study investigated physiological responses of the clam *Corbula amurensis* to varying salinity. A key new insight from this study is that resting *Corbula* clams appear to maintain unusually high levels of "metabolic machinery" that could be "revved up" rapidly in response to increasing food availability or salinity. This would be a useful adaptation to highly variable estuarine conditions and will be investigated further. The study also found that energy demand and grazing rates were highest at high salinities and the clams did not survive in fresh water.

Paganini, Adam, Wim J. Kimmerer, and Jonathon H. Stillman. 2010. Metabolic Responses to Environmental Salinity in the Invasive Clam *Corbula amurensis*. Aquatic Biology 11: 139-147. http://www.int-res.com/abstracts/ab/v11/n2/p139-147/

* An analysis of long-term IEP monitoring data showed that benthic invertebrate assemblages shift geographically along the estuarine salinity gradient, depending on outflows. There was nothing unusual about the composition of benthic assemblages during the POD period.

Peterson, Heather A, & Vayssieres, Marc. 2010. Benthic Assemblage Variability in the Upper San Francisco Estuary: A 27-Year Retrospective. San Francisco Estuary and Watershed Science, 8(1). Retrieved from: http://escholarship.org/uc/item/4d0616c6

* This analysis of the long-term IEP zooplankton monitoring data showed declines in historically abundant larger copepods and increases in smaller introduced species leading to an overall decrease in mean zooplankton size and an inferred decrease in zooplankton food quality. Changes in the biomass, size and possibly chemical composition of the zooplankton community imply major alterations in pelagic food-web processes, including a drop in prey for foraging fish and an increase of carbon recycling in the microbial food web.

Winder, Monika, and Alan D. Jassby. 2010. Zooplankton dynamics in the upper San Francisco Estuary: Long-term trends and food web implications. Estuaries and Coasts DOI: 10.1007/s12237-010-9342-x. http://www.springerlink.com/content/b30544u2xx0l235u/

* Long-term IEP monitoring data show that food web effects of more recent drought have been amplified by water management in the San Francisco estuary. Non-native zooplankton species started replacing native species in the upper estuary in the 1970s when increasing inputs from Asian ballast water coincided with extended drought periods. Water management reduced freshwater inflow even further, increasing drought severity and allowing unusually extreme salinity intrusions. Unprecedented high salinity

levels and intensified benthic grazing allowed non-natives to outcompete native species and colonize the system.

Winder, Monika, Alan D. Jassby and Ralph Mac Nally. 2011. Synergies between climate anomalies and hydrological modifications facilitate estuarine biotic invasions. Ecological Letters. published online: 6 JUN 2011 DOI: 10.1111/j.1461-0248.2011.01635.x http://onlinelibrary.wiley.com/doi/10.1111/j.1461-0248.2011.01635.x/full

Contaminants:

* Commercial formulations of two commonly used insecticides, bifenthrin and fipronil, were more toxic than the pure active ingredients, suggesting that increased toxicity due to inert ingredients should be considered in risk assessments and regulation of insecticides. Significant sublethal effects on fish swimming performance or growth were observed at 10-20% of the concentrations that kill 10% of exposed fish (LC10).

Beggel S., Werner I., Connon R.E., Geist J. 2010. Sublethal toxicity of commercial insecticide formulations and their active ingredients to larval fathead minnow (*Pimephales promelas*). Science of the Total Environment 408: 3169–3175. http://www.sciencedirect.com/science/article/pii/S004896971000358X

* The effects of copper on survival, swimming velocity and molecular biomarkers were measured in larval and juvenile delta smelt. Swimming velocity declined on exposure in a dose dependent manner with a decrease at approximately 20% of the LC50 concentration. The newly developed molecular biomarkers indicated significant sublethal effects of copper on nerve and muscle function, digestion and immune function at approximately 20% of the LC50 concentration. Results from this study support the use of functionally characterized molecular biomarkers to assess effects of contaminants in field scenarios.

Connon R.E., Beggel S., D'Abronzo L.S., Geist J., Loguinov A.S., Vulpe C.D., Werner I. 2010. Linking molecular biomarkers with higher level condition indicators to identify effects of copper exposures on the endangered delta smelt (*Hypomesus transpacificus*). Environmental Toxicology and Chemistry Volume 30(2): 290–300. DOI: 10.1002/etc.400. http://onlinelibrary.wiley.com/doi/10.1002/etc.400/full

* This study evaluated the effects of natural environmental factors on acetylcholinesterase (AChE) activity in juvenile striped bass. AChE activity is a commonly used biomarker for neurotoxicity of contaminants. Results show that water temperature and fish size, but not salinity, affect AChE activity and need to be taking into account when interpreting results about contaminant effects.

Durieux, Eric D. H., Thomas B. Farver, Patrick S. Fitzgerald, Kai J. Eder and David J. Ostrach. 2010. Natural factors to consider when using acetylcholinesterase activity as neurotoxicity biomarker in Young-Of-Year striped bass (*Morone saxatilis*). Fish Physiol Biochem 37:21–29 DOI 10.1007/s10695-010-9412-9 http://www.springerlink.com/content/n575g1770q5w38h1/fulltext.pdf

* Despite the rapid growth of the Bay Area, Sacramento, and Stockton metropolitan areas, the percentage of urban area and rates of change in subregions of the upper San Francisco estuary are generally low to moderate when compared to other estuaries in the United States. Nevertheless, the estuary as a whole as well the southern and western

subregions are classified as stressed by urbanization on the basis of impervious cover. *(NCEAS paper)*

Stoms, David M. 2010. Change in Urban Land Use and Associated Attributes in the Upper San Francisco Estuary, 1990-2006. San Francisco Estuary and Watershed Science, 8(3). Retrieved from: http://escholarship.org/uc/item/5db1g3pq

* Water column toxicity to the amphipod *Hyalella azteca* was monitored at 15-16 Delta channel sites biweekly in 2006 and 2007. Of all samples tested, 5.8% caused significant mortality. Areas most impacted were the Lower Sacramento River and Shipping Channel. Ammonia/um as well as certain pyrethroid and OP pesticides and/or contaminants occurring in mixture with these were likely responsible for some of the observed toxicity.

Werner, I., L.A. Deanovic, D. Markiewicz, J. Khamphanh, C.K. Reece, M. Stillway, C. Reece. 2010. Monitoring acute and chronic water column toxicity in the northern Sacramento-San Joaquin Estuary, California, USA, using the euryhaline amphipod, *Hyalella azteca*: 2006-2007. Environmental Toxicology and Chemistry 29(10): 2190–2199. http://onlinelibrary.wiley.com/doi/10.1002/etc.281/abstract

* In toxicity tests, urban source waters to the Delta were almost always toxic to *Hyalella* due to pyrethroid pesticides. Agricultural runoff samples were toxic less often. SRWTP effluent was the largest source of pyrethroids to the Delta in this study.

Weston D. P. and M. J. Lydy. 2010. Urban and Agricultural Sources of Pyrethroid Insecticides to the Sacramento-San Joaquin Delta of California. Environ. Sci. Technol. 44 (5): 1833–1840. http://www.water.ca.gov/iep/docs/pod/weston_urban_and_ag.pdf

Habitat:

* This project developed statistical models that can be used to forecast water temperature within the Delta as a response to atmospheric conditions. Using data from climate change scenarios, the model forecasts increases in the number of days that have water temperatures that cause high delta smelt mortality (especially along the Sacramento River) and a shift in thermal conditions for spawning to earlier in the year.

Wagner, R. Wayne, Mark Stacey, Larry R. Brown and Michael Dettinger. 2011. Statistical Models of Temperature in the Sacramento-San Joaquin Delta Under Climate-Change Scenarios and Ecological Implications Estuaries and Coasts 34:544–556, DOI 10.1007/s12237-010-9369-z. http://water.usgs.gov/nrp/proj.bib/Publications/2011/wagner_stacey_etal_2011.pdf

Submitted, by general IEP topic:
(14 manuscripts to date)

Fish:

* This pilot project found that delta smelt can be readily mass-marked to evaluate and monitor entrainment losses into the State Water Project (SWP). Delta smelt losses in Clifton Court Forebay (CCF; so-called pre-screen losses) ranged from 94% to 99.9%, with greater losses at higher water residence time in CCF and at lower SWP pumping rates.

Castillo, Gonzalo, Jerry Morinaka, Joan Lindberg, Robert Fujimura, Bradd Baskerville-Bridges, James Hobbs, Galen Tigan and Luke Ellison. In review. Pre-Screen Loss and Fish Facility Efficiency for Delta Smelt at the South Delta's State Water Project, California. San Francisco Estuary and Watershed Science.

* This paper provides the first quantitative estimates of feeding by striped bass, the top predator in the estuary. High abundance of adult striped bass around the time of the onset of the POD was associated with relatively high consumption of prey fish.

Loboschefsky, Erik, Gina Benigno, Ted Sommer, Timothy Ginn, Arash Massoudieh, Kenny Rose, Frank Loge. In review. Bioenergetic Modeling of San Francisco Estuary Striped Bass. San Francisco Estuary and Watershed Science.

* Particle tracking represents a powerful but computationally intensive tool to examine fish entrainment and transport in the San Francisco estuary. This paper proposes and alternative modeling approach that was successfully applied to historical striped bass egg and larval data.

Massoudieh, Arash, Erik Loboschefsky, Ted Sommer , Timothy Ginn, Kenneth Rose, Frank Loge. In review. Spatio-temporal modeling of striped bass egg and larval movement and fate in the San Francisco Bay-Delta. Ecological Modeling.

* The IEP has long preserved fish collected during monitoring surveys in formalin. These fish are often used later for additional analyses. This study assessed preservation effects on fish length and weight and found changes in both measures during the first 3 weeks of preservation and stabilization after 8 weeks. This indicates that studies investigating length-weight or condition changes should to be strictly consistent in timing of post-preservation measurements or wait for 8+ weeks. Otherwise, additional process based variation will be added.

Slater, S. In review. Effects of Formalin Preservation and Delayed Measurements on Length, Weight, and Condition Estimates of Longfin Smelt, Striped Bass, and Threadfin Shad. North American Journal of Fisheries Management.

The fish community in the Yolo Bypass is dominated by non-native, year-round resident fish species. Native fish species use the floodplain as a migration corridor and for spawning and rearing and are generally most abundant during flood pulses.

Harrell, William C., Ted R. Sommer and Frederick Feyrer. In review. Fish migration and residency in a large river floodplain of the Sacramento River, California. Western North American Naturalist.

Food web:

* Ammonium discharged into the Sacramento River by the Sacramento Regional Wastewater Treatment Plant is largely exported downstream and remains sufficiently high to negatively affect phytoplankton in Suisun, San Pablo and Central San Francisco Bays. In the central Sacramento River, phytoplankton primary production was only 55% of the primary production upstream of the WWTP outfall.

Parker, A.E., F.P. Wilkerson, R.C. Dugdale. In review, Elevated ammonium concentrations from wastewater discharge depress primary productivity in the Sacramento River and the northern San Francisco Estuary. Marine Pollution Bulletin.

Contaminants:

* New molecular tools can clearly detect sublethal effects of low concentrations of the common pyrethroid pesticide bifenthrin in larval fathead minnow (*Pimephales promelas*). Effects detected in this study include neurological damage, loss of the ability to swim and detoxify, and endocrine disruption.

Beggel, Sebastian, Richard E. Connon, Inge Werner, Juergen Geist. In review. Changes in gene transcription and whole organism responses in larval fathead minnow (*Pimephales Promelas*) following short-term exposure to the synthetic pyrethroid bifenthrin. Aquatic toxicology.

* This laboratory study used previously developed molecular tools (DNA microarrays and qPCR) to assess genome-wide effects of ammonia exposure on delta smelt. Results show that delta smelt are more sensitive to ammonia than rainbow trout and ammonia primarily affects cell membrane stability, but also energy metabolism and other physiological and neurological processes.

Richard E. Connon, Linda A. Deanovic, Erika B. Fritsch, Leandro S. D'Abronzo and Inge Werner. In review. Sublethal responses to ammonia exposure in the endangered Delta smelt; *Hypomesus Transpacificus* (fam. Osmeridae). Aquatic toxicology.

* Conventional methods of testing pesticides on a chemical by chemical basis or conducting bioassays with standard test organisms are unlikely to be useful in assessing the effects of complex mixtures of many chemicals on the ecosystem, especially when many of the effects are non-lethal and chronic. However, such chronic effects may be important in the population biology of the species in an ecosystem, including the POD fishes. Such problems might best be addressed by reducing transport of all pesticides to the aquatic environment rather than identifying specific chemicals suspected to be important. *(NCEAS paper)*

Scholz, Nathaniel L., Erica Fleishman, Larry Brown, Inge Werner, Michael L. Johnson, Marjorie L. Brooks, Carys L. Mitchelmore, and Daniel Schlenk. In review. Pesticides and the decline of pelagic fishes in western North America's largest estuarine ecosystem. Conservation Letters.

amueller
Sep 15, '10, 3:16 PM
Added Text

amueller
Sep 15, '10, 3:12 PM
Added: Paragraph Break

amueller
Sep 15, '10, 3:16 PM
Added Text

amueller
Sep 15, '10, 3:13 PM
Added Text

amueller
Sep 15, '10, 3:16 PM
Added Text

amueller
Sep 15, '10, 3:14 PM
Added Text

amueller
Sep 15, '10, 3:16 PM
Added Text

amueller
Sep 15, '10, 3:15 PM
Added Text

amueller
Sep 15, '10, 3:14 PM
Added: Space

* Although the San Francisco Estuary is one of the best studied estuaries in the world, the ecological effects of contaminants remain largely unknown, and are difficult to investigate with standard toxicological methods and existing data. Our work suggests that sublethal stress from metals, nutrient-rich effluents, M. aeruginosa blooms, and pesticides are potential contributors to, but not the sole cause of, past and ongoing declines in abundances of pelagic fishes of concern. *(NCEAS paper)*

Brooks, Marjorie L., Erica Fleishman, Larry R. Brown, Peggy H. Lehman, Inge Werner, Nathaniel Scholz, Carys Mitchelmore, Michael L. Johnson, Daniel Schlenk, Suzanne van Drunick , James Drever, David M. Stoms, Alex E. Parker, Richard Dugdale. In review. Potential contributions of contaminants to the decline of pelagic fishes in the San Francisco Estuary, California, USA. Environmental Management.

Habitat:

* This study used small-footprint LiDAR data acquired by the CA DWR to model the shading effects of Delta levee vegetation on solar radiation incident on Delta waterways surfaces. Vegetation removal was simulated using the bare-earth digital elevation model product from the LiDAR data, and insolation will increase significantly in narrow and shallow channels across the Delta

Greenberg, Jonathan, Erin Hestir, David Riano, George Scheer, and Susan Ustin. In review. Using LiDAR data analysis to estimate changes in insolation under large-scale riparian deforestation Journal of the American Water Resources Association.

* This study developed and successfully applied a novel machine learning classification scheme to map the distribution of submerged aquatic vegetation (SAV) such as *Egeria densa* in the Delta from airborne imaging spectroscopy. From 2004-2008, SAV cover in the Delta ranged from 928 ha to 2336 h. This new remote sensing tool can now be used for systematic, automated, and robust SAV detection with minimal field work as long as the necessary imagery is available. Acquisition of this imagery stopped in 2008.

Hestir, E.L., J.A. Greenberg, and S.L. Ustin. In review. Classification Trees for Aquatic Vegetation Community Prediction from Imaging Spectroscopy. IEEE Journal of Applied Remote Sensing.

* The growth and spread of submerged aquatic vegetation (SAV) in the Delta is controlled by water velocities, not light availability. SAV grows best at annual water velocities below 0.49 m/s and suppresses turbidity levels in its vicinity by reducing sediment resuspension.

Hestir, E.L., D.H. Schoellhamer, J.A. Greenberg, T. Morgan-King, and S.L. Ustin. In review. Interactions between Submerged Vegetation, Turbidity, and Water Movement in a Tidal River Delta. Water Resources Research,

* Turbidity in the Delta has been declining from 1975-2008, with detrimental effects on delta smelt and other native species. 21-71% of the total declining trend during this period can be explained by the expansion of invasive submerged aquatic vegetation (SAV). Anthropogenic controls on sediment supply including dams and levee construction led to an increase in light availability and a rapid expansion of invasive SAV.

This rapid expansion and the positive feedback between SAV and turbidity shifted the ecosystem into a high-SAV, low-turbidity state. We suggest that this is a "catastrophic regime shift" because it is unlikely that the ecosystem will return to its previous high turbidity state, even upon removal of SAV.

* Hestir, E.L., D.H. Schoellhamer, J.A. Greenberg, T. Morgan-King, and S.L. Ustin. In review. Turbidity Declines and Submerged Aquatic Vegetation Expansion in a Tidal River Delta. Estuaries and Coasts.

Other publications using IEP data

Cloern, J.E., A.D. Jassby, J. Carstensen, W.A. Bennett, W. Kimmerer, R. Mac Nally, D.H. Schoellhamer and M. Winder. 2011. Perils of correlating CUSUM-transformed variables to infer ecological relationships (Breton et al. 2006, Glibert 2010). Limnology and Oceanography, in press.

Glibert, P.M. 2010. Long-term changes in nutrient loading and stoichiometry and their relationships with changes in the food web and dominant pelagic fish species in the San Francisco Estuary, California. Reviews in Fisheries Science 18:211–232. http://www.informaworld.com/smpp/content~db=all~content=a926412420~frm=abslink

Kimmerer, Wim J. 2011. Modeling Delta Smelt Losses at the South Delta Export Facilities. San Francisco Estuary and Watershed Science, 9(1). Retrieved from: http://escholarship.org/uc/item/0rd2n5vb

Miller, William J. 2011. Revisiting Assumptions that Underlie Estimates of Proportional Entrainment of Delta Smelt by State and Federal Water Diversions from the Sacramento-San Joaquin Delta. San Francisco Estuary and Watershed Science, 9(1). Retrieved from: http://escholarship.org/uc/item/5941x1h8

Moyle, Peter B, Lund, Jay R., Bennett, William A, & Fleenor, William E.(2010). Habitat Variability and Complexity in the Upper San Francisco Estuary. San Francisco Estuary and Watershed Science, 8(3). Retrieved from: http://escholarship.org/uc/item/0kf0d32x