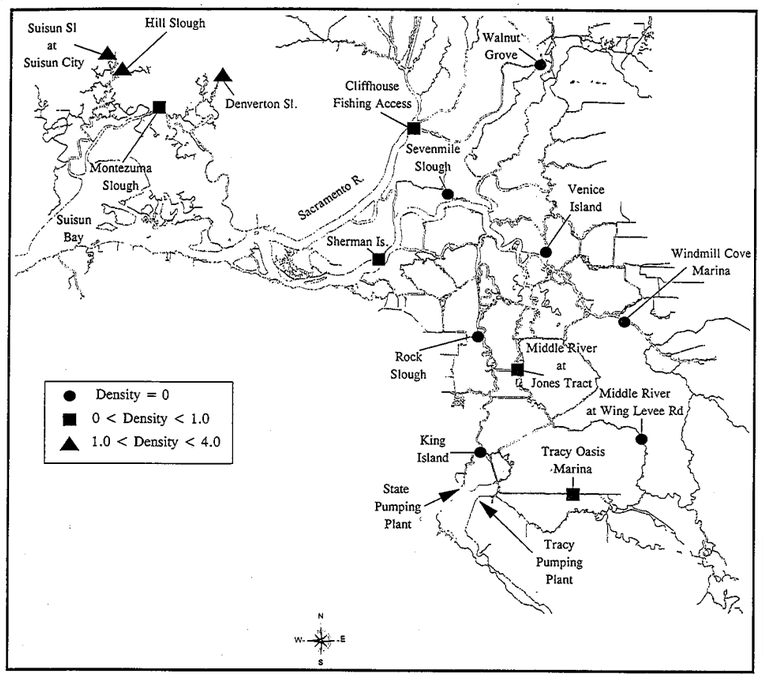

Figure 1
AVERAGE DENSITY OF JUVENILE CHINESE MITTEN CRABS, SUMMER 1997

August (n=13), and 31.0 mm in September (n=7). Additional crabs, which were determined to be age-1 or age-2, were collected in July, August and September. These totals represent only a small fraction of crabs located at the pumps. Only crabs caught during the periodic 10-minute counts were saved; others were salvaged with the fish without being counted. Also, fish facility crews reported finding crabs in the floating debris caught against the screens and among the louver structures.

The Interagency Program will continue to monitor juvenile mitten crabs. Sampling will occur in July and August, the peak migration period of juvenile crabs to brackish and freshwater rearing areas. We plan to add several more stations in the delta, including additional core stations in the central and western delta and a peripheral station in the southeastern delta.

Acknowledgments

I thank Anna Holmes and Jennifer Osmondson (DFG) for their assistance in field collections and developing sampling procedures; Kathy Hieb for the opportunity to collaborate on the design and implementation of a biological study; USBR personnel at Tracy Fish Collection Facility and DFG personnel at the Skinner Fish Facility for crab collections; Kathleen Halat of Wetlands Research Associates and Diana Theriault of UC-Berkeley for guidance on sampling protocol and sharing data; Dave Feliz of Grizzly Island Wildlife Area and Bay-Delta Division personnel who provided valuable advice on locations of potential monitoring sites; and Paul Raquel, Tracy Oasis Marina, and Windmill Cove for access to their property. This work is part of the Green and Mitten Crab Studies, funded and supported by the Interagency Ecological Program.

Literature

Halat, K.M. 1997. The distribution and abundance of the Chinese mitten crab (*Eriocheir sinensis*) in southern San Francisco Bay, 1995-1996. M.S. Thesis, University of California, Berkeley, 80 pp.

Hieb, K. 1997. Chinese mitten crabs in the delta. IEP *Newsletter*, 10(1)14-15.

Panning, A. 1938. The Chinese mitten crab. *Annual Report Smithsonian Institution*, pp. 361-375.

Annual Interagency Program Workshop

The 1998 workshop will be February 25-27, at Asilomar Conference Center in Pacific Grove. As in years past, the workshop will provide information on a number of projects via oral and poster presentations and panel discussions. The Bay-Delta Modeling Forum will hold its spring meeting and workshop February 24-25 at Asilomar, so you can attend all or part of both workshops.

The planning committee is now formulating an agenda for the IEP workshop. The agenda will go out with the registration forms in December. Please contact Chuck Armor (carmor@delta.dfg.ca.gov) or Zach Hymanson (zachary@water.ca.gov) for information.

Late-Summer 1997 Dissolved Oxygen Conditions in the Stockton Ship Channel

Steve Hayes, DWR

Dissolved oxygen concentrations in the Stockton Ship Channel are closely monitored during the late summer and early fall, because levels can drop below 5.0 mg/L in the eastern channel due to low inflow, warm temperature, high biochemical oxygen demand, reduced tidal circulation, and intermittent reverse flows in the San Joaquin River past Stockton. Low dissolved oxygen levels can cause physiological stress to fish and block upstream migration of salmon.

The first of eight dissolved oxygen runs for this year was August 4, and monitoring is scheduled to continue through November. During each run, 14 sites are sampled from Prisoners Point (site 1) in the central delta to the turning basin (site 14) (Figure 1). Dissolved oxygen and water temperature data are collected for each site at the top and bottom of the water column during ebb slack tide using continuous monitoring instrumentation made available by USBR.

The August 4 sampling showed a definite depression (sag) in the eastern channel (Figure 2). Surface and bottom dissolved oxygen levels were relatively high (>7.0 mg/L) in the western portion of the channel from Prisoners Point to Columbus Cut (site 5). Dissolved oxygen decreased east of this region, with bottom levels dropping below 5.0 mg/L from Turner Cut (site 8) to the middle of the Rough and Ready Island area (site 12). Surface levels dropped below 5.0 mg/L in the heart of this area from Turner Cut to Fourteenmile Slough (site 9). Warm water (25-27°C), reduced tidal circulation, and intermittent reverse flows in the San Joaquin River past Stockton appear to have contributed to the low dissolved oxygen levels in the eastern channel. Average daily flow

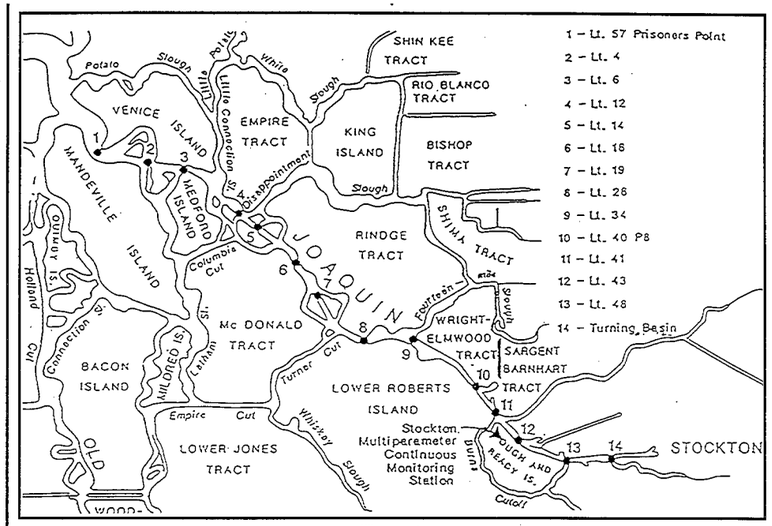

Figure 1
DISSOLVED OXYGEN SAMPLING SITES

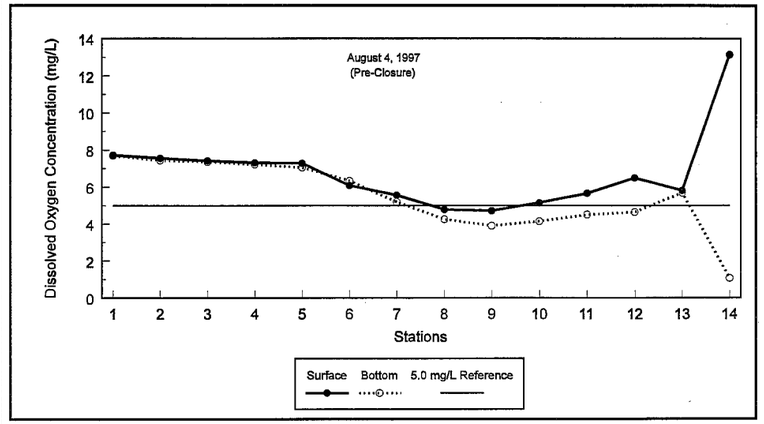

Figure 2
DISSOLVED OXYGEN CONCENTRATIONS IN THE STOCKTON SHIP CHANNEL

past Stockton was -316 to -446 cfs during the week preceding the run. The return of surface dissolved oxygen levels above 5.0 mg/L in the Rough and Ready Island area (sites 11 to 13) and bottom levels above 5.0 mg/L at site 13 could be partly due to the local influence of San Joaquin River inflow to the ship channel east of Rough and Ready Island. Average daily flow in the San Joaquin River past Vernalis approached 1,900 cfs in July — intermediate between the higher average daily flows of about 2,500 cfs in July 1996 and the lower average daily flow of about 1000 cfs during July in drought years.

The exceptionally high (13.1 mg/L) surface and critically low (1.1 mg/L) bottom dissolved oxygen levels measured in the Stockton Turning Basin (site 14) appear to be the result of localized biological and water quality conditions in the basin. The basin is

at the eastern dead-end terminus of the ship channel and is subject to reduced tidal activity, restricted water circulation, and increased water residence times compared to the rest of the channel. As a result, water quality and biological conditions in the turning basin have historically differed from those in the main downstream channel, and have led to extensive summer algal blooms and dieoffs. Early August 1997 was no exception, and an intense algal bloom composed primarily of Cryptomonads and green flagellated algae was detected. The bloom appears to have produced the highly stratified dissolved oxygen conditions in the water column of the turning basin. The high dissolved oxygen levels at the surface are caused by the extensive algal productivity present, and the low dissolved oxygen conditions at or near the bottom of the turning basin are caused, in part, by dead or dying algae settling out of the water column and sinking to the bottom. Bottom dissolved oxygen levels in the basin are further degraded by high BOD loadings in the area due to regulated discharges into the San Joaquin River and recreational activity adjacent to the basin.

Adaptive Management of Emigrating San Joaquin Salmon Smolts

Bruce Herbold (EPA)

San Joaquin River flows and SWP/CVP exports are commonly believed to affect survival of juvenile fall-run chinook salmon emigrating from the San Joaquin River Basin. Mark/recapture studies have not been performed at the intermediate flow and export rates specified in the 1995 Water Quality Control Plan, so the exact nature of the response of smolt survival to moderate flow levels are a subject of contention. The data generally show that survival rates through the delta for emigrating chinook salmon have been low in recent years.

Experiments are necessary to determine if exports and flows can be manipulated to provide an adequate level of smolt protection; an effort to achieve this has come to be known as the Vernalis Adaptive Management Program (VAMP). The 1995 WQCP and the FWS Biological Opinion for delta smelt require that exports be kept a constant function of San Joaquin flow, so it would be impossible to identify the separate impacts of either. VAMP attempts to ensure that flows, on average, are consistent with the WQCP and that export levels satisfy the intent of the Biological Opinion. An essential component of VAMP is a coordinated release strategy of tagged fish and additional intensive sampling downstream.

The design of this investigation has been based on earlier investigations and on expected opportunities for providing increased fish protection during the spring. Because a permit for constructing a barrier at the head of Old River has been approved for the next 5 years, such a barrier is assumed to be in place in all years when flows are low enough. The value of the barrier will be assessed via release of tagged fish above and below the head of Old River and their subsequent recapture at Jersey Point, Chipps Island, and the salvage facilities.

Table 1 shows the combinations of flow and export rates specified in VAMP for years when the barrier at the head of Old River can be installed. In years of higher flow, exports will be at one of the three specified levels to permit evaluation of the protection provided by the barrier.

Flows at Vernalis are largely a function of upstream regulatory requirements and streamside accretions and depletions. VAMP specifies that flows from April 15 to May 15 will be increased to the next greater flow level in VAMP from that during April 7-14. In addition, a "double step" to the second higher flow level is required when unimpaired flows are high enough.

Efforts were made in 1997 to meet VAMP conditions. Water was purchased by Interior to achieve the 5,700 cfs Vernalis flow rate, and exports were coordinated with the SWP to a total of 2,250 cfs. Preliminary results suggest sampling is not needed at night and that careful selection of the sampling location can minimize the incidental capture of delta smelt. Recapture rates were good, and survival estimates of the new sampling regime generally reflect results of the traditional Chipps Island recaptures. Agreements with tributary water users are coming to a conclusion and will be submitted to SWRCB for review in December. These agreements represent contributions of all involved parties toward making VAMP succeed.

Conditions specified in VAMP will likely need to be in place for the next 10 to 12 years before conclusions can be reached. In that time it may also be possible to determine the role of flows and exports on many other aspects of the southern delta.

Table 1
PROPOSED FLOW AND EXPORT RATES

Proposed flow and export rates (in cfs) to achieve experimental goals with a level of protection that exceeds the SWRCB level of protection (ratio of inflow to exports = 1) in all years and to meet goals of the delta smelt biological opinion. Vernalis flow of 2,000 cfs applies only in later years of a drought if insufficient water is available for meeting 3,200 cfs.

	Vernalis Flow Rate (cfs)			
Exports	7000	5700	4450	3200/2000
1500	A (4.5:1)		B (2.9:1)	C (2.1:1)
2250		D (2.6:1)		
3000	E (2.3:1)			

Enhancing the Role of the Management Team

Pat Coulston

Many of the issues addressed during the July 30-31 Coordinators' retreat relate to the role and responsibilities of the Management Team. Creation of the Management Team was one of the important recommendations resulting from the 1993 review of the Interagency Program (Herrgesell *et al* 1993.). The intended role of the new Management Team was to translate agency and stakeholder information needs into program actions (monitoring, special studies, workshops, reports), principally through the creation and oversight of project work teams. Responsibilities specifically given to the Management Team included:

- Developing and tracking budgets.
- Overseeing development of an annual work plan.
- Reviewing products.
- Overseeing and administering data management.
- Coordinating the field program.
- Planning and implementing the annual workshop.

Many of these tasks had been within the purview of the Coordinators. The Management Team was created and given these tasks because competing demands on the Coordinators' time made it impossible for them to also manage the Interagency Program.

The role and responsibilities of the Management Team was a central topic of the July Coordinators' retreat, because it was clear that the Management Team was not fully functioning as envisioned by the 1993 program revision. Although the Management Team has been effective in coordinating the complex interagency implementation of program activities, the Coordinators agreed that the management team should take more responsibility in truly managing the program. A secondary aspect of this responsibility was to further emphasize some housekeeping issues. As a result of the retreat, the Management Team will focus on the following actions during the next 4 months:

- Hold more frequent Management Team meetings and provide members and the Coordinators with meeting summaries within 3 days.
- Review the composition of the Management Team and recommend changes in membership and levels of member involvement.
- Conduct a thorough review of all project work teams, including the appropriateness of their missions, their individual effectiveness, and Management Team representation on the project work teams.
- Prepare and distribute written guidelines for the roles and responsibilities of project work teams and their members and leaders.
- Delegate Management Team tasks more evenly among team members.
- Develop agendas for Coordinators' meetings that are generally limited to significant policy issues and provide background information and related recommendations so the Coordinators can effectively and efficiently play their policy-level oversight role.

Also in response to suggestions at the Coordinator's retreat, the Management Team has played a larger and more active role in developing the 1998 Interagency Program Work Plan. The Management Team has worked closely with the project work teams in development of individual proposed work plans. It has also met several times to review project work team plans and formulate an overall work plan that is consistent with program objectives, priorities, and budget. This recommended plan was submitted to the Coordinators on October 20.

The Management Team has nine formal members, who supervise most of the agency resources (staff, boats, and equipment) involved in Interagency Program monitoring and special studies. All are senior biologists or engineers deeply involved in bay/delta ecological issues. Members are:

Pat Coulston, IEP Program Manager

Chuck Armor, Senior Biologist, DFG Bay-Delta Division

Patricia Brandes, Supervisory Fishery Biologist, FWS Sacramento-San Joaquin Estuary Fisheries Resource Office

Larry Brown, Fisheries Biologist, USBR

Darryl Hayes, Senior Engineer, DWR Environmental Services Office

Zachary Hymanson, Environmental Specialist IV, DWR Environmental Services Office

Don Stevens, Supervising Biologist, DFG Bay-Delta Division

Kevan Urquhart, Senior Biologist, DFG Bay-Delta Division

Leo Winternitz, Environmental Program Manager, DWR Environmental Services Office

To promote coordination with the San Francisco Estuary Institute, the Management Team meetings are routinely attended by *ex officio* member Dr. Bruce Thompson, a senior scientist at San Francisco Estuarine Institute.

Reference

Herrgesell, P.L., M.A. Kjelson, J. Arthur, L. Winternitz, and P. Coulston. 1993. *A Review of the Interagency Ecological Study Program and Recommendations for its Revision*. Report to the IESP Coordinators, August 1993. 72 pp.