

Exhibit DFG-T-B

ROBERT G. TITUS

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CURRICULUM VITAE

EDUCATION

- 1991 PhD, Limnology, Uppsala University, Sweden. Dissertation: *Population regulation in migratory brown trout (Salmo trutta)*
- 1986 MSc, Biological Sciences, California State University, Sacramento. Thesis: *Comparative hooking mortality of Lahontan cutthroat trout at Heenan Lake, California*
- 1984–1985 Course work in limnology (24 semester units), Uppsala University, Sweden as participant in California State University International Program
- 1981 BA, Biological Sciences, California State University, Sacramento

POSITIONS

- 2004–present *Senior Environmental Scientist* (senior supervisor), California Department of Fish and Game, Fisheries Branch, Sacramento, California
- 2002–2004 *Staff Environmental Scientist* (senior specialist), California Department of Fish and Game, Stream Evaluation Program, Sacramento, California
- 1996–2002 *Environmental Specialist III*, California Department of Fish and Game, Stream Evaluation Program, Sacramento, California
- 1999–present *Lecturer*, Department of Biological Sciences, California State University, Sacramento (please see below for specific teaching assignments)
- 1996–present *Adjunct Professor*, Department of Biological Sciences, California State University, Sacramento
- 1993–1996 *Associate Fishery Biologist*, California Department of Fish and Game, Stream Evaluation Program, Sacramento, California
- 1992–1993 *Post-graduate Researcher*, Department of Forestry & Resource Management, University of California, Berkeley
- 1987–1991 *Graduate Student Researcher/Lecturer*, Institute of Limnology, Uppsala University, Sweden
- 1986 *Fishery Biologist*, U. S. Bureau of Reclamation, Sacramento, California
- 1985 *Laboratory Assistant*, Institute of Limnology, Uppsala University, Sweden
- 1983–1984 *Biological Technician*, U. S. Bureau of Reclamation, Sacramento, California
- 1982–1983 *Graduate Student Assistant*, California Department of Water Resources, Delta Branch, Sacramento, California
- 1981 *Fish and Wildlife Seasonal Aid*, California Department of Fish and Game, Wild

TEACHING EXPERIENCE

Lecturer, Department of Biological Sciences, Sacramento State University

- Natural Resource Conservation (**BIO 118**), fall semesters 2001–2005, 2007–2010
- General Ecology (**BIO 160**), spring & fall 2009, spring 2010
- Principles of Fishery Biology (**BIO 173**), fall 2000
- Research Methods in Biological Sciences (**BIO 220**), spring & fall 2006
- Conservation Policy and Administration (**BIO 270**), spring 1999, 2001, 2003, 2005, 2008
- Advanced Fishery Biology & Management (**BIO 273**), spring 2004, 2007, 2011

ARTICLES

- Sogard, S.M., Swank, D.R., Beakes, M.P., Satterthwaite, W.H., Collins, E.M., Merz, J.E., Titus, R.G., and M. Mangel. *Submitted*. Contrasts in growth rates and life history patterns of juvenile steelhead in stream systems of California's Central Valley and central coast. *Transactions of the American Fisheries Society*
- Beakes, M.P., Satterthwaite, W.H., Collins, E.M., Swank, D.R., Merz, J.E., Titus, R.G., Sogard, S.M. and M. Mangel. 2010. Smolt transformation in two California steelhead populations: effects of temporal variability in growth. *Transactions of the American Fisheries Society* 139:1263–1275.
- Satterthwaite, W.H., M.P. Beakes, E.M. Collins, D.R. Swank, J.E. Merz, R.G. Titus, S.M. Sogard, and M. Mangel. 2009. State-dependent life history models in a changing (and regulated) environment: steelhead in the California Central Valley. *Evolutionary Applications* 3:221-243.
- Satterthwaite, W.H., M.P. Beakes, E.M. Collins, D.R. Swank, J.E. Merz, R.G. Titus, S.M. Sogard, and M. Mangel. 2009. Steelhead life history on California's central coast: insights from a state-dependent model. *Transactions of the American Fisheries Society* 138:532–548.
- Vincik, R.F., and R.G. Titus. 2007. Occurrence of a eulachon *Thaleichthys pacificus* in the lower Sacramento River, California. *California Fish and Game* 93:161–165.
- Volkoff, M.C. and R.G. Titus. 2007. Use of otolith microstructure to discriminate stocks of juvenile Central Valley, California, fall-run Chinook salmon. *Transactions of the American Fisheries Society* 136:195–210.
- Titus, R.G., M.C. Volkoff, and W.M. Snider. 2004. Use of otolith microstructure to estimate growth rates of juvenile Chinook salmon from a Central Valley, California stock. *American Fisheries Society Symposium* 39:181–202.
- Titus, R.G. and H. Mosegaard. 1992. Fluctuating recruitment and variable life history of migratory brown trout, *Salmo trutta* L., in a small, unstable stream. *J. Fish Biol.* 41:239–255.
- Titus, R.G. and H. Mosegaard. 1991. Selection for growth potential among migratory brown trout (*Salmo trutta*) fry competing for territories: evidence from otoliths. *Can. J. Fish. Aquat. Sci.* 48:19–27.
- Titus, R.G. 1990. Territorial behavior and its role in population regulation of young brown trout (*Salmo trutta*): new perspectives. *Ann. Zool. Fennici* 27:119–130.
- Titus, R.G. and H. Mosegaard. 1989. Smolting at age 1 and its adaptive significance for migratory trout, *Salmo trutta* L., in a small Baltic-coast stream. *J. Fish Biol.* 35 (Suppl. A):351–353.
- Titus, R.G. and C.D. Vanicek. 1988. Comparative hooking mortality of lure-caught Lahontan cutthroat trout at Heenan Lake, California. *Calif. Fish Game* 74:218–225.

Mosegaard, H. and R. Titus. 1987. Daily growth rates of otoliths in yolk sac fry of two salmonids at five different temperatures. Pages 221–227 in S. O. Kullander and B. Fernholm (eds.). Proc. Fifth Cong. Europ. Ichthyol., Stockholm, 1985. Swed. Mus. Nat. Hist., Stockholm.

MANUSCRIPTS

Collins, E.M., Titus, R.G., Beakes, M.P., Swank, D.R., Merz, J.E., Sogard, S.M., Satterthwaite, W.H., and M. Mangel. Food availability as a determinant of growth opportunity in contrasting steelhead streams in central California. In prep for Transactions of the American Fisheries Society.

Titus, R. G., and C. E. Zimmerman. An integrated approach for characterizing individual life histories of steelhead rainbow trout. (in prep for submission to Calif. Fish Game)

Titus, R. G., and M. C. Volkoff. Life history diversity in Sacramento River (California) steelhead.

Titus, R. G., D. C. Erman, and W. M. Snider. History and status of steelhead in California coastal drainages south of San Francisco Bay. (~300 page monograph in manuscript)

TECHNICAL REPORTS

Simon, C., Satterthwaite, W.H., Beakes, M.P., Collins, E.M., Swank, D.R., Merz, J.E., Titus, R.G., Sogard, S.M., and M. Mangel. 2010. Individual and population level variation in growth parameters for steelhead trout *Oncorhynchus mykiss* in central California. Baskin School of Engineering Technical Report UCSC-SOE-10-31.

Titus, R. (ed.) 2008. Annual Project Performance Report: F-119-R, Central Valley Angler Survey, July 1, 2007 to June 30, 2008. Report to U.S. Fish and Wildlife Service, California/Nevada Operations Office, Federal Assistance for Sport Fish Restoration Act.

Brown, M. S., R.G. Titus, and W. M. Snider. 2008. Flow fluctuation effects on anadromous salmonid populations in the Stanislaus River, California. Calif. Dept. Fish Game, Wildlife and Fisheries Division, Fisheries Branch, Sacramento.

Titus, R. 2007. Annual Project Performance Report: F-119-R, Central Valley Angler Survey, July 1, 2006 to June 30, 2007. Report to U.S. Fish and Wildlife Service, California/Nevada Operations Office, Federal Assistance for Sport Fish Restoration Act.

Titus, R. 2006. Annual Project Performance Report: F-119-R, Central Valley Angler Survey, July 1, 2005 to June 30, 2006. Report to U.S. Fish and Wildlife Service, California/Nevada Operations Office, Federal Assistance for Sport Fish Restoration Act.

Reavis, R. R., R. G. Titus, W. M. Snider, and J. Lyons. 2005. Upper Sacramento River winter-run Chinook salmon escapement survey, May–August 2002. Calif. Dept. Fish Game, Habitat Conservation Division, Stream Evaluation Program Technical Report No. 05-01.

Snider, B., and R. G. Titus. 2002. Lower American River juvenile salmonid emigration survey, October 1998–September 1999. Calif. Dept. Fish Game, Habitat Conservation Division, Stream Evaluation Program Technical Report No. 02-02.

Snider, B., Reavis, B., R. G. Titus, and S. Hill. 2002. Upper Sacramento River winter-run Chinook salmon escapement survey, May–August 2001. Calif. Dept. Fish Game, Habitat Conservation Division, Stream Evaluation Program Technical Report No. 02-01.

Snider, B., and R. G. Titus. 2001. Lower American River emigration survey, October 1997–September 1998. Calif. Dept. Fish Game; Habitat Conservation Division, Stream Evaluation Program Technical Report No. 01-6.

Snider, B., and R. G. Titus. 2000d. Timing, composition and abundance of juvenile anadromous salmonid emigration in the Sacramento River near Knights Landing, October 1998–September 1999. Calif. Dept. Fish Game, Habitat Conservation Division, Stream Evaluation Program Technical Report No. 00-06.

Titus, R. G. 2000. Adult steelhead collected in the Calaveras River below New Hogan Dam in

- March 2000. Calif. Dept. Fish Game, Native Anadromous Fish Watershed Branch. Report prepared for Calif. Dept. Fish Game.
- Snider, B., and R. G. Titus. 2000c. Timing, composition and abundance of juvenile anadromous salmonid emigration in the Sacramento River near Knights Landing, October 1997–September 1998. Calif. Dept. Fish Game, Habitat Conservation Division, Stream Evaluation Program Technical Report No. 00-05.
- Snider, B., and R. G. Titus. 2000b. Timing, composition and abundance of juvenile anadromous salmonid emigration in the Sacramento River near Knights Landing, October 1996–September 1997. Calif. Dept. Fish Game, Habitat Conservation Division, Stream Evaluation Program Technical Report No. 00-04.
- California Department of Fish and Game (Titus, R., A. Vejar, and D. McEwan). 2000. Steelhead rainbow trout in San Mateo Creek, San Diego County, California. Calif. Dept. Fish Game, Native Anadromous Fish Watershed Branch and South Coast Region. Report prepared for National Marine Fisheries Service.
- Snider, B., and R. G. Titus. 2000a. Lower American River emigration survey, October 1996–September 1997. Calif. Dept. Fish Game, Habitat Conservation Division, Stream Evaluation Program Technical Report No. 00-02.
- Snider, B., R. G. Titus, and B. A. Payne. 1998. Lower American River, emigration survey, October 1995–September 1996. Calif. Dept. Fish Game, Environmental Services Division, Stream Evaluation Program Technical Report No. 98-6.
- Snider, B., and R. Titus. 1998. Evaluation of juvenile anadromous salmonid emigration in the Sacramento River near Knights Landing, November 1995–July 1996. Calif. Dept. Fish Game, Environmental Services Division, Stream Evaluation Program Technical Report No. 98-5.
- Snider, B., R. G. Titus, and B. A. Payne. 1997. Lower American River emigration survey, November 1994–September 1995. Calif. Dept. Fish Game, Environmental Services Division, Stream Evaluation Program Technical Report No. 97-3.
- Vyverberg, K., B. Snider, and R. G. Titus. 1997. Lower American River, chinook salmon spawning habitat evaluation, October 1994. Calif. Dept. Fish Game, Environmental Services Division, Stream Evaluation Program Technical Report.
- Snider, B., and R. Titus. 1996. Fish Community Survey, Lower American River, January through June 1995. Calif. Dept. Fish Game, Environmental Services Division, Stream Evaluation Program Technical Report No. 96-3.
- Snider, B., and R. G. Titus. 1995. Lower American River, emigration survey, November 1993–July 1994. Calif. Dept. Fish Game, Environmental Services Division, Stream Evaluation Program Technical Report.
- Titus, R. G. and H. Mosegaard. 1991. Multi-aged emigration of brown trout (*Salmo trutta*) in a small Baltic-coast stream: a mechanism for population persistence in an unstable environment. Page 20 in *The Role of Aquaculture in Fisheries*. Nordiske Jordbrugforskere Forening, Proc. from NJF seminar 194, Report No. 72.
- Titus, R. G. 1984. San Luis Drain Report of Waste Discharge, Appendix A.3, Receiving and Supply Water Characteristics, Vol. III: Fishes. U. S. Bur. Reclam., Mid-Pacific Region, Sac., CA 141 p.
- Titus, R. G., A. Pickard, and B. W. Collins. Effects of passage through low velocity fan pumps on juvenile chinook salmon and American shad. Interagency Ecological Study Program for the Sacramento–San Joaquin Estuary, Technical Report (DRAFT).

SELECT GRANTS/CONTRACTS

- 2001–2005: U.S. Fish and Wildlife Service, \$30,000 to *Comparative Growth of Central Valley, California Riverine and Delta Rearing Juvenile Chinook Salmon Based on Otolith Microstructure Patterns*. R. Titus, principal investigator.
- 1997/98–98/99: California Department of Water Resources and U.S. Fish and Wildlife Service, \$25,000 per year to *Use of Otoliths to Evaluate the Role of Delta Rearing in the Life History of Central Valley Chinook Salmon and Steelhead*. R. Titus, principal investigator.
- 1997/98–98/99: East Bay Municipal Utility District, \$31,000 to *Growth Rates of Juvenile Chinook Salmon in the Lower American River: Backcalculation using Otoliths*. R. Titus, P.I.
- 1992/93: California Department of Fish and Game, Environmental Services Division, \$59,540 to *Status of steelhead trout in California, with emphasis on central and south coast stocks*. R. Titus, author, coapplicant with D. C. Erman.

SELECT RECENT PROFESSIONAL ACTIVITY

- Served as referee for *Journal of Fish Biology*, *Transactions of the American Fisheries Society*, *North American Journal of Fisheries Management*, *California Fish and Game*, *Ecology*, and the proceedings of the first, second, and fourth international symposia on otolith research and application
- Presented, *Biological justification of a water temperature target for juvenile steelhead in the Central Valley, California* (oral presentation) and *Comparative growth of Central Valley, California juvenile fall-run Chinook salmon sampled from riverine, delta, and hatchery rearing habitats* (poster), at American Fisheries Society Annual Meeting, San Francisco, CA, September 2007. Co-author on two other presentations given by program colleagues.
- Presented, *Life History Diversity in Sacramento River Steelhead*, California Bay-Delta Authority Science Conference, Sacramento, CA, October 2004
- Presented, *Recruitment In Experimental Releases Of Brown Trout: Patterns In Dispersal And Survival Relative To Fry And Otolith Growth*, Third International Symposium on Fish Otolith Research and Application: Innovation and Implementation, Townsville, Queensland, Australia, July 2004
- Participated in State Water Resources Control Board water rights hearing for the Cachuma Project (Santa Ynez River), providing primary testimony on behalf of DFG, October 2003
- Presented, *Use Of Otolith Microstructure To Estimate Growth Rates Of Juvenile Chinook Salmon From A Central Valley, California Stock*, 27th Annual Larval Fish Conference, Santa Cruz, CA, August 2003
- Presented, *What Do Analyses Of Carcass Survey Estimates, Screw Trap Catches, And Other Information Tell Us About Juvenile Winter-Run Chinook Production, Emigration Timing, And Factors Affecting Their Survival?*, CALFED-sponsored Environmental Water Account (EWA) Salmonid Workshop, California State University, Sacramento, July 2003

PROFESSIONAL MEMBERSHIPS

American Fisheries Society, California Association of Professional Scientists, California Faculty Association, American-Hellenic Professional Society