

DR. RONALD J. RYEL

Education

Ph.D. 1994 (Plant Ecophysiology) University of Würzburg, Germany

M.S. 1980 (Wildlife Ecology) Utah State University

B.S. 1977 (Ecology and Mathematics) Michigan State University

Professional Experience

1987-Present. Systems Ecologist and Wildlife Biologist, Ryel and Associates, Logan, Utah.

1997-1998. (2 weeks each year) Guest instructor, Lehrstuhl für experimentelle Ökologie und Ökoystembiologie, Universität Bielefeld, Germany.

1995-1998. (1 month each year) Guest Scientist, Lehrstuhl für experimentelle Ökologie und Ökoystembiologie, Universität Bielefeld, Germany.

1993, 1995, 1997. (1 month each year) Guest Scientist, Bayreuther Institut für Terrestrische Ökosystemforschung, Universität Bayreuth, Germany.

1989, 1993-1994. (1 month each year) Guest Scientist, Julius-von-Sachs-Institut für Biowissenschaften Lehrstuhl für Botanik II, Universität Würzburg, Germany.

1990-1992. Scientific Co-worker, Julius-von-Sachs-Institut für Biowissenschaften Lehrstuhl für Botanik II, Universität Würzburg, Germany.

1981-1986. Systems Ecologist, Data Analyst and Manager, Ecosystem Research Institute, Logan, Utah.

1980-1981. Operations Research Analyst, Northern Fur Seal Project, National Marine Fisheries Service, U.S. Department of Commerce, Seattle, Washington.

1979-1980. Research Assistant, Department of Range Science, Utah State University, Logan, Utah.

1978-1979. Ornithologist, Bio/West Inc., Logan, Utah.

1977-1978. Research Assistant, Department of Wildlife Science, Utah State University, Logan, Utah.

1975-1977. Student Biological Aid, Utah Division of Wildlife Resources, Cedar City, Utah.

Current Projects

Evaluate pulsing of plant-available moisture and nitrogen in Great Basin plant communities. Work is in cooperation with Dr. Martyn Caldwell, Ecology Center, Utah State University, Logan, Utah.

Develop simulation model to assess the effects of leaf-cutter ants on light attenuation in tropical rainforest, Barro Colorado Island, Panama. Work is in cooperation with Dr. Wolfram Beyschlag, Lehrstuhl für experimentelle Ökologie und Ökoystembiologie, Universität Bielefeld, Germany.

Assess changes in primary and secondary productivity in upper Colorado River as related to altered flows regimes in cooperation with U. S. Fish and Wildlife Service, University of Colorado, and Ecosystems Research Institute. Work involves project overview, statistical design and data analysis.

Past Projects

Develop statistical models for classifying forest community types, and classifying watershed types.

Developed integrated simulation models to evaluate resource patchiness in Great Basin sagebrush-grassland ecosystem in cooperation with Martyn Caldwell, Department of Range Science, Utah State University, Logan Utah (NSF Grant).

Model light attenuation in tussock grass canopies to assess structural characteristics of these grasses. Work involved development of a three-dimensional light-interception and photosynthesis model for tussock grasses, later applied to spruce trees.

Development and validation of a multi-species canopy photosynthesis model for use in assessing the competitive abilities of wheat and wild oats under increased ultraviolet radiation exposure.

Development of a single species canopy photosynthesis model.

Develop method to calculate stream sinuosity from GIS database.

Simulation modeling of Northern fur seal population dynamics for National Marine Fisheries Service, U.S. Department of Commerce, Seattle, Washington.

Simulation modeling of raptor nesting success with agricultural encroachment in the Birds of Prey Natural Area, Idaho for U.S. Bureau of Land Management.

Development of model to assess mule deer productivity estimators for Utah Division of Wildlife Resources, Salt Lake City, Utah.

Past Projects (continued)

Development of rating system to assess non-point source impacts on riverine-riparian ecosystems.

Provided statistical aid in assessment of Colorado squawfish population in Colorado, River.

Address statistical, ecological and population dynamics issues related to humpback chubs in the Grand Canyon for U.S. Bureau of Reclamation in cooperation with Bio/West Inc., Logan, Utah. Co-author of final report.

Provide statistical advice for analysis of various fisheries data in Green, Colorado and Virgin Rivers in Utah.

Participated in field studies pertaining to biology and ecology of native fishes in the Colorado and Green Rivers.

Compiled database and constructed habitat utilization curves for rare fishes in the upper Colorado River basin for U.S. Bureau of Reclamation.

Compilation of all the Colorado River basin rare fish data into a single data base for the Colorado Water Congress Data management and analysis of data collected during a larval fish study on the Colorado River, near Grand Junction Colorado.

Data management, analysis and summary of data concerning water resources in the Needles District of Canyonlands National Park, Utah. Analysis and development of aquatic monitoring parameters of White River ecosystem for oil shale development.

Design and operate data management system for data collected on White River oil shale tracts.

Baseline assessment and monitoring of White River ecosystem for oil shale development.

Data management, monitoring and evaluation of surface and ground water resources for White River Shale Oil Corporation oil shale development near Bonanza, Utah.

HEC modeling of flows in Convict Creek (California) and Big Creek (Utah) to aid in designing stream restoration structures.

Managed and summarized stream habitat data from Utah, Idaho and Nevada for Whitehorse Associates, Smithfield Utah.

Past Projects (continued)

Data management and model application relative to reservoir and river water quality in the lower Bear River watershed. Study design, data analysis, data management, modeling, report preparation and expert testimony for natural resource damage assessment for Colorado State Attorney General's Office in regards to four CERCLA lawsuits.

Database development and management for a data collected on a mill site near Salt Lake City.

Determination of hazardous waste sources and extent of contamination for a site in Salt Lake City, Utah.

Address wildlife habitat issues related to selecting wetland mitigation sites in conjunction with development of Ridges Basin Reservoir, Animas-LaPlata Project, for U.S. Bureau of Reclamation.

Evaluate status and habitat for southwest willow flycatcher along San Juan River as related to flows.

Assess wildlife impacts relative to proposed hydroelectric facility in Idaho.

Assess impacts to wildlife of expansion of Logan-Cache, Utah airport in Biological Assessment.

Assess impacts to wildlife of expansion of Afton, Wyoming airport.

Review wildlife resources as affected by proposed expansion of Nephi Airport, Nephi, UT.

Develop wetland mitigation plans for waterfowl and other waterbirds related to a proposed business park in West Valley City, Utah.

Develop wetland mitigation plans for waterfowl, shorebirds and other waterbirds related to a proposed airport expansion in Salt Lake City, Utah.

Develop and implement supplemental feeding plan for bald eagles in area affected by hydroelectric facility in eastern Idaho.

Assessing waterfowl and other wildlife resources relative to FERC permitting for hydroelectric facilities in Utah.

Develop and implement program to evaluate wildlife use in wetland mitigation area for Horseshoe Bend Hydroelectric Project, Idaho.

Past Projects (continued)

Wildlife resources evaluation for EIS on proposed hydroelectric facility in Kauai, Hawaii.

Development of mitigation plan for endangered waterbirds related to proposed hydroelectric projects in Kauai, Hawaii.

Conducted survey for Newell's shearwaters along proposed hydroelectric penstock route on Kauai, Hawaii.

Design and conduct surveys for endemic fish in two streams in Kauai, Hawaii, relative to proposed hydroelectric development.

Conducted survey for Boreal Owls for U. S. Forest Service in High Uinta Mountains, Utah.

Baseline assessment of avian populations on proposed uranium mines in central Wyoming.

Coordinated and participated in census of bald and golden eagles in Cache County, Utah for Utah Division of Wildlife Resources.

Conducted census of snowy plovers in Cache County, Utah for Utah Division of Wildlife Resources.

Conducted raptor and forest bird surveys near Steamboat Springs, Colorado, for Bio/West Inc. in conjunction with proposed ski resort development.

Participated in census of the endangered Kirtland's Warbler in Michigan for Michigan Department of Natural Resources.

Collection of biological data on Northern Fur Seals for National Marine Fisheries Service, Seattle, Washington.

Publications

Ryel RJ, Caldwell MM (1998) Nutrient acquisition from soils with patchy nutrient distributions: Importance of patch size, degree of variability and root uptake kinetics. *Ecology* 79:2735-2744.

Werner C, Correia O, Ryel RJ, Beyschlag W (1998) Modelling whole-plant primary production of macchia species: Assessing the effects of photoinhibition and foliage orientation. *Revista Biologia* 16:247-257.

Beyschlag W, Ryel RJ (1998) Canopy modeling. In: Pugnaire FI, Valladares F (eds) *Handbook of Functional Plant Ecology*. Marcel Dekker Inc., New York (in press).

Ryel RJ, Tenhunen JD, Falge E, Geyer R, Joss U, Siegwolf R, Bürgler M (1999) Estimation of CO₂ fixation and water loss by *Pinus sylvestris* at the Hartheim plantation with a canopy model including penumbral influences. *Agricultural and Forest Meteorology* (in review).

Ryel RJ, Valdez RA (1999) Population and survival estimates of humpback chub (*Gila cypha*) in the mainstem Colorado River in Grand Canyon, Arizona. *North American Journal of Fisheries Management* (in preparation).

Ryel RJ, Valdez RA (1999) Movement of humpback chub in the Colorado River, Grand Canyon, Arizona. *North American Journal of Fisheries Management* (in preparation).

Osmundson DB, Tucker ME, Burdick DB, Elmlad WR, Chart TE, Ryel RJ (1998) Non-spawning movements of subadult and adult Colorado squawfish in the upper Colorado River. *Transactions of American Fisheries Society* (in press).

Tenhunen J, Alsheimer M, Falge E, Heindl B, Joss U, Köstner B, Lischeid G, Manderscheid B, Ostendorf B, Peters K, Ryel R, Wedler M (1998) Water fluxes in a spruce forest ecosystem: a framework for process study integration. In: Hantschel R, Beese F, Lenz R (eds) *Processes in Managed Ecosystems*. Ecological Studies Series, Springer Verlag, Berlin (in press).

Beyschlag W, Ryel RJ (1998) Modeling leaf/canopy photosynthesis. In: Raghavendra AS (ed) *Photosynthesis: A comprehensive treatise*. Cambridge University Press. pp. 305-319.

Osmundson DB, Ryel RJ, Mourning TE (1997) Growth and survival of Colorado squawfish in the upper Colorado River. *Transactions of American Fisheries Society* 126:687-698.

Publications (continued)

Falge E, Joss U, Alsheimer M, Geyer R, Köstner B, Niinemets Ü, Ryel RJ, Tenhunen JD (1997) Eine Modellhierarchie zur Schätzung der Wassernutzungseffizienz bei veränderten Umweltbedingungen. In: Mühle H, Eichler S (eds) Terrestrische ökosystemare Forschung in Deutschland. Stand und Ausblick. UFZ-Bericht Nr. 5/1997, Leipzig-Halle. pp. 70-74.

Falge E, Ryel RJ, Alsheimer M, Tenhunen JD (1997) Sensitivity of stand structure and physiology on forest gas exchange: A simulation study for Norway spruce. *Trees Structure and Function* 11:436-448.

Wirth R, Ryel RJ, Beyschlag W, Hölldobler B (1997) Annual foraging pattern of the leaf-cutting ant *Atta colombica* (L.) in a semideciduous rain forest in Panama. *Journal of Tropical Ecology* 13:741-757.

Valdez RA, Ryel RJ (1997) Life history and ecology of the humpback chub population in the Colorado River in Grand Canyon, Arizona. *Proceedings of the Third Biennial Conference on Research in Colorado Plateau National Parks*, U.S. Department of Interior, National Park Service pp. 3-31.

Ryel RJ, Caldwell MM, Manwaring JH (1996) Temporal dynamics of soil spatial heterogeneity in sagebrush-wheatgrass steppe during a growing season. *Plant and Soil* 184:299-309.

Ryel RJ, Beyschlag W, Heindl B, Ullmann I, Klein M (1996) Experimental studies on the competitive balance between two Central European roadside grasses with different growth forms: 1. Field experiments on the effects of mowing and maximum leaf temperatures on competitive ability. *Botanica Acta* 109:441-448.

Beyschlag W, Ryel RJ, Ullmann I, Eckstein J (1996) Experimental studies on the competitive balance between two Central European roadside grasses with different growth forms: 2. Controlled experiments on the influence of soil depth, salinity and allelopathy on competitive ability. *Botanica Acta* 109:449-455.

Eckstein J, Beyschlag W, Mott KA, Ryel RJ (1996) Changes in photon flux can induce stomatal patchiness. *Plant, Cell and Environment* 19:1066-1074.

Ryel RJ, Beyschlag W (1995) Benefits associated with steep foliage orientation in two tussock grasses of the American Intermountain West. A look at whole-plant water-use-efficiency and photoinhibition. *Flora* 190:251-260.

Ryel RJ, Beyschlag W, Caldwell MM (1994) Light field heterogeneity among tussock grasses: theoretical considerations of light harvesting and seedling establishment. *Oecologia* 98:241-246.

Publications (continued)

Beyschlag W, Ryel RJ, Dietsch C (1994) Shedding of older needle age classes does not necessarily reduce photosynthetic primary production of Norway spruce. Analysis with a 3-dimensional canopy photosynthesis model. *Trees Structure and Function* 9:51-59.

Beyschlag W, Ryel RJ, Caldwell MM (1994) Photosynthesis of vascular plants; assessing canopy photosynthesis by means of simulation models. In: Caldwell MM, Schulze D-E (eds) *Ecophysiology of photosynthesis*, Ecological Studies 100. Springer-Verlag, New York-Heidelberg-Berlin. pp 409-430.

Beyschlag W, Kresse F, Ryel RJ, Pfanz H (1994) Stomatal patchiness in conifers: experiments with *Picea abies* (L.) Karst. and *Abies alba* Mill. *Trees Structure and Function* 8:132-138.

Ryel, RJ, Beyschlag W, Caldwell MM (1993) Foliage orientation and carbon gain in two tussock grasses as assessed with a new whole-plant gas-exchange model. *Functional Ecology* 7:115-124.

Ryel, RJ (1993) Light relations in tussock grasses as assessed with a new three-dimensional canopy photosynthesis model. Structure and function of foliage organization of a growth form prevalent in environments characterized by stress. PhD Dissertation, Univ. Würzburg, Germany. 163 pp.

Beyschlag W, Ryel RJ, Ullmann I (1992) Experimental and modeling studies of competition for light in roadside grasses. *Botanica Acta* 105:285-291.

Beyschlag W, Pfanz H, Ryel RJ (1992) Stomatal patchiness in Mediterranean evergreen sclerophylls. Phenomenology and consequences for the interpretation of the midday depression in photosynthesis and transpiration. *Planta* 187:546-553.

Ryel RJ, Barnes PW, Beyschlag W, Caldwell MM, Flint SD (1990) Plant competition for light analyzed with a multispecies canopy model. I. Model development and influence of enhanced UV-B conditions on photosynthesis in mixed wheat and wild oat canopies. *Oecologia*. 82:304-310.

Barnes PW, Beyschlag W, Ryel RJ, Flint SD, Caldwell MM (1990) Plant competition for light analyzed with a multi-species canopy model. III. Influence of canopy structure in mixtures and monocultures of wheat and wild oat. *Oecologia*. 82:560-566.

Publications (continued)

Beyschlag W, Barnes PW, Ryel RJ, Caldwell MM, Flint SD (1990) Plant competition for light analyzed with a multi-species canopy model. II. Influence of photosynthetic characteristics in mixtures of wheat and wild oat. *Oecologia*. 82:374-380.

Carter JG, Lamarra VA, Ryel RJ (1986) Drift of larval fishes in the Upper Colorado River. *Journal of Freshwater Ecology*. 3(4):567-577.

Valdez RA, Carter JG, Ryel RJ (1985) Drift of larval fishes in the Upper Colorado River. Proceedings of the Western Assoc. of Fish and Wildlife Agencies and the Western Div. Am. Fish. Soc., Snowmass, CO. 172-185.

Carter JG, Valdez RA, Ryel RJ (1985) Fisheries habitat dynamics in the Upper Colorado River. *Journal of Freshwater Ecology*. 3(2):249-264.

Fowler CW, Nelson L, Ryel RJ (1982) Sperm whale population analysis. U.S. Dept. of Commerce, NTIS Publication No. PB82-174335.

Ryel RJ (1980). An analysis of a measure of productivity in mule deer populations. M.S. Thesis, Utah State Univ. 102 pp.

Fowler C W, Bunderson T, Cherry M, Ryel RJ, Steele B (1980) Comparative population dynamics of large mammals: A search for management criteria. U.S. Dept. of Commerce, NTIS Publication No. PB80-178627.

Fowler CW, Ryel RJ. (1978) Projection matrices in population dynamics. *Encyclia*. 55:39-46.

Recent Invited Papers

Nutrient uptake in a patchy environment: The case of *Agropyron desertorum*. School for Experimental Ecology and Ecosystem Biology, University of Bielefeld, Germany. 25-Oct-1996.

Nutrient uptake in a patchy environment: The case of crested wheatgrass. Portuguese Ecological Society, University of Lisbon, Portugal. 30-Oct-1996.

Modelling hydraulic lift in grass-shrublands. School for Experimental Ecology and Ecosystem Biology, University of Bielefeld, Germany. 21-May-1997.

Modeling acquisition of belowground resources. IGBP-GCTE/Euroflux Workshop, Duke University, Durham, NC. 15-Oct-1997.

Modelling competition for light - review paper. GCTE Workshop: Modelling Inter-Plant Competition in Natural and Agro-Ecosystems. Department of Theoretical Production Ecology, Wageningen Agricultural University, The Netherlands. 112-Nov-1997.

Recent Reports

Distribution, Relative Abundance, and Environmental Correlates for Age-0 Colorado Squawfish and Sympatric Fishes in the Colorado River. Final Report for Recovery Implementation Program, Project No. 45. U.S. Fish and Wildlife Service, Colorado River Fishery Project, Grand Junction, CO. 1999. (with CW McAda).

Biological Assessment Report, Fort Bridger Airport Expansion Project, Uinta County, Wyoming. Report to Aviation Concepts, St. Francis, Kansas. 1998 (with CK Johnson).

Review of Wildlife Resources and Wetland Functions along the Proposed 2700 North Corridor, Weber County. Report to DMJM, Salt Lake City, Utah. 1998. (with CK Johnson).

Wildlife Resources of the West/East Light Rail Transit Project Corridor. Report to Wasatch Front Regional Council and Utah Transit Authority, Salt Lake City, Utah. 1998.

Stream Temperature Considerations in the Development of Plum Creek's Native Fish Habitat Conservation Plan. Plum Creek Timber Company Native Fish Habitat Conservation Plan, Technical Report #12. Plum Creek Timber Company, Columbia Falls, Montana. 1998. (with BD Sugden, TW Hillman, JE Caldwell).

Recent reports (continued)

Studies of Colorado Squawfish in the upper Colorado River. Report A: Growth and survival of Colorado squawfish in the upper Colorado River. Final Report for Recovery Implementation Program, Project No. 14. U.S. Fish and Wildlife Service, Colorado River Fishery Project, Grand Junction, CO. 1997. (with DB Osmundson and TE Mourning).

Environmental Assessment of Wildlife Resources as Related to the Proposed Expansion at Logan-Cache Airport. Report to Armstrong Consultants, Inc., Grand Junction, Colorado. 1997. (with CK Johnson).

Environmental Assessment, Nephi Municipal Airport. Final report to Nephi City, Nephi, Utah. 1996. (with J Rogers, C Johnson).

Life history and ecology of the humpback chub (*Gila cypha*) in the Colorado River, Grand Canyon, Arizona. Final Report to Bureau of Reclamation, Salt Lake City, Utah. 1995. (with RA Valdez).

Conceptual wetland mitigation plan: Ridges Basin wetland mitigation project, Durango, Colorado. Final report to Bureau of Reclamation, Durango, Colorado. 1995. (with C Johnson, M Matheson, M Oliver).

Biological assessment, threatened bald eagle, Island Park Hydroelectric Project spillway modification, FERC No. 2973. Final report to US Fish and Wildlife Service, Boise, Idaho. 1995.

HEP analysis, Black Pine mitigation site, Hay Canyon. Final report to Black Pine Mining, Inc., Burley, Idaho. 1995. (with S Jensen).

Environmental Assessment, Island Park Hydroelectric Project, proposed spillway modification, Island Park, Idaho. Prepared for Fall River Rural Electric, Inc., Ashton, Idaho. 1995. (with V Lamarra, K Lawrence, N Messner).

Development of a population model for humpback chub (*Gila cypha*) in Grand Canyon. Draft report submitted to Glen Canyon Environmental Studies and Bureau of Reclamation. 1995. (with RA Valdez).

Development of a population model for humpback chub (*Gila cypha*) in Grand Canyon. Program Element I. A feasibility evaluation completion report to Bureau of Reclamation, Salt Lake City, Utah. 1994. (with RA Valdez).

Wildlife monitoring and mitigation plan for Horseshoe Bend Hydroelectric Project. Report to LBI, Inc., Horseshoe Bend, Idaho. 1994.

Black Pine Mine habitat evaluation. Final report to Black Pine Mining, Inc., Burley, Idaho. 1993. (with S Jensen, C Johnson, V Lamarra).

Recent reports (continued)

Monitoring and maintenance plan for the Salt Lake City Airport Authority wetlands mitigation site. Final report to Salt Lake City Airport Authority. 1993. (with S Jensen, C Johnson, V Lamarra, M Oliver).

Environmental Assessment, Afton Municipal Airport. Final report to Afton Municipal Airport, Afton, Wyoming. 1993. (with J Rogers, C Johnson).

Stream/riparian habitat assessment, North Fork Humboldt/Gance Creeks, Elko County, Nevada. Final report to Independence Mining Company, Elko, Nevada. 1992. (with S Jensen).

Lake Park conceptual wetland mitigation plan. Prepared for Don White and Associates, Salt Lake City, Utah. 1992. (with C Johnson, V Lamarra).