

Curriculum Vitae

Nancy Nicolai

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RESEARCH INTERESTS

Mechanisms and dynamics of plant-animal interactions in arid environments; community sustainability by animal activities at multiple landscape scales; and herbivore foraging theory, approaches using field manipulative experiments and simulation modeling.

EDUCATION

Doctor of Philosophy, Rangeland Ecology & Management
Texas A&M University, College Station, TX

Dissertation: "Plant community dynamics governed by red harvester ant (*Pogonomyrmex barbatus*) activities and their role as drought refugia in a semi-arid savanna."

Master of Science, Biology/Ecology emphasis
San Diego State University, San Diego, CA

Thesis: "Small mammal seed predation and seedling establishment of a shrub, *Isomeris arborea*."

Bachelor of Science, Biology
Nebraska Wesleyan University, Lincoln, NE

Senior Research: "Territorial patrolling in yellow warbler, Itasca, Minnesota."

RESEARCH EXPERIENCE

Research Adjunct Assistant Professor, Department of Biology, University of New Mexico, Dec. 2008 -Present

Investigating facilitation in an ecotone at Sevilleta LTER in the lab. of Scott Collins. Conducted study with 3 college students on influence of habitat restoration techniques on the Rio Grande bird community. Wrote 5 grants and with the help of Tim Lowrey, Museum of Southwestern Biology and New Mexico Tech, restored ecological processes in a unique fen.

Postdoctoral Research Associate, Jacob Blaustein Institute for Desert Research, Ben-Gurion University of the Negev, Israel, Dec. 2005-Nov. 2006

In Laboratory of Bertrand Boeken, independently examined structure and composition of Negev Desert plant communities altered by harvester ant nest patches and granivory. Also used cutting edge spatial statistics to test relative influence of shrub spatial arrangement on annual plant assemblages. Collaborated with Dr. Boeken on community analyses.

Doctoral Graduate Student, Department of Rangeland Ecology and Management, Texas A&M University, 2000-2005

In the lab. of Fred Smeins, investigated alterations made by harvester ant processes of granivory and nest construction to grassland spatial and temporal dynamics disturbed by fire,

drought, and long-term herbivory. Simulation modeling found ants modify long-term grass dynamics. **Major advances:** Discovery of ant nests as drought refugia for grasses and centers for faster grassland recovery. Revealed seasonal and grazing-regime patterns in seed selection by ants.

Wildlife Management Ecologist, Bureau of Land Management, southern California

Lead PI on 7 grants while managing field program of \$25,000 + field crews of 1-10 including 7 students. Independently designed and conducted experiments on vehicle recreation impacts leading to altered lizard abundance. Investigated the recovery of plant, ant, and small mammal populations from gravel mining using 3 rehabilitation techniques including configuration of intact vegetation patches, studied using field experiments.

Field Biologist, Manomet Bird Observatory

Banded and observed breeding behavior of endangered California gnatcatcher and rare coastal cactus wren for demographic study in Laboratory of Jon Atwood. Managed 5 researchers monitoring 90+ nests.

Behavioral Observer, Center for Reproduction of Endangered Species/San Diego Zoo

Observed and summarized reproductive behaviors to assure success of captive endangered species including Sumatran rhinoceros. Developed statistics for pre-egg laying behavior in the California condor.

Wilderness Wildlife Technician, Interagency Grizzly Bear Study Team

As a team, studied activities and foods gathered at radioed female grizzly bear locations to determine foraging patterns in the Greater Yellowstone Ecosystem.

TEACHING EXPERIENCE

Lecturer, Department of Planetary and Earth Sciences, University of New Mexico, January 2010-Present

Taught Introductory Biology (4 hrs.) for Education majors. Developed curriculum, exercises, laboratory, and field techniques. Taught content and laboratory/field skills that can be used in their future biology pedagogy.

Postdoctoral Assistant Professor, Department of Agronomy and Horticulture, University of Nebraska, May 2007-July 2008

Taught Vegetation Analysis (3 hrs.) for upper division Range majors. Added new techniques to curriculum including simulation modeling, summary statistics, and spatial analyses. Prepared all lecture material, field techniques, and grading tools. Course covered theories and procedures for collecting range and vegetation data. Co-taught Introduction to Range Science (3 hrs.), 46 students, for Agriculture majors. Updated lectures on management theories including State and Transition Models, biodiversity, and endangered species.

Team-based Teaching Seminar, University of Nebraska, School of Natural Resources

Attended hands-on workshop “Developing teams in the classroom”. Learned methods for incorporating into curriculums.

Graduate Teaching Assistant, Department of Rangeland Ecology and Management, Texas A&M University

Taught two sections of Ecology Laboratory weekly for two semesters. Course covered introduction to quantitative techniques in field ecology. Taught one section of Range Management and one of Range Ecology Laboratory for one semester. Introduced web-based learning to curriculum. Used active learning techniques and created weekly lectures. One 20-page writing assignment was due in each course.

College Teaching, Texas A&M University, Graduate course

Team-taught a one-hour instruction on implementing Experiential Learning in the college curriculum.

Graduate Teaching Assistant, Department of Biology, San Diego State University

Conducted two sections of laboratory weekly with class of 26 students. Prepared all weekly lecture material and grading tools. Instructed Biology, Botany Laboratories for non-majors and Vertebrate Zoology Laboratory for majors.

HONORS AND AWARDS

Honorary Societies

Phi Kappa Phi, Sigma Xi, Gamma Sigma Delta, N. Am. Colleges & Teachers of Agriculture

- Tom Slick Senior Graduate Fellow, Texas A&M University.
- Graduate Equity Fellowship, Texas A&M University.
- Graduate Merit Fellowship, San Diego State University.
- Best student presentation award at American Association for the Advancement of Science/Southwestern Div. Conference, Tucson.
- Best student presentation award at American Association for the Advancement of Science/Pacific Div. Conference, San Diego.
- Second Place student poster at International Society for Range Management Conference.
- Governor’s Appreciation Award for contributions to the Pueblo, Santo Domingo Reservation, New Mexico, 2008.
- Two Achievement Awards, Bureau of Land Management.

PUBLICATIONS

PEER-REVIEWED PUBLICATIONS

Nicolai, N. and B. Boeken. Accepted 2011. Shift in seed availability due to harvester ant nest formation and granivory in a semiarid shrubland, Israel. *Ecological Entomology*.

Nicolai, Nancy, William E. Grant, and Fred E. Smeins. In Press 2011. Animal influences on dynamics of plant communities: simulated effects of harvester ants on plant populations. *Texas Journal of Science*.

Nicolai, Nancy, Rusty A. Feagin, and Fred E. Smeins. 2010. Spatial patterns of grass seedling recruitment imply predation and facilitation by harvester ants. *Environmental Entomology* 39: 127-133.

Nicolai, Nancy and James Stubbendieck. Accepted 2009. Alternative methods for wetland restoration in the Rainwater Basin, Nebraska, USA. *Rangeland Ecology and Management*.

Nicolai, Nancy, Fred E. Smeins, and Jerry L. Cook. 2008. Harvester ant nests improve recovery performance of drought impacted vegetation in grazing regimes of a semiarid savanna, Texas. *American Midland Naturalist* 160: 29-40.

Nicolai, Nancy, Jerry L. Cook, and Fred E. Smeins. 2007. Grassland composition affects season shifts in seed preference by *Pogonomyrmex barbatus* (Hymenoptera, Myrmicinae) in the Edwards Plateau, Texas. *Environmental Entomology* 36: 433-440.

Nicolai, N. C. and Jeffrey Lovich. 2000. Changes in the behavior of flat-tailed horned lizards (*Phrynosoma mcallii*) following an off-highway vehicles race in California. *California Dept. of Fish and Game* 86: 208-212.

Nicolai, Nancy. 2000. Distribution of *Gambelia silus*, *Ammospermophilus nelsoni*, *Dipodomys ingens*, and *Vulpes macrotis mutica* in the southern San Joaquin Valley, California based on surveys by the California Energy Commission. in D.F. Williams and T.A. Rado, editors. *Endangered and sensitive species of the San Joaquin Valley, California: their biology, management, and conservation*. The Wildlife Society.

IN REVIEW

Nicolai, Nancy. Seedling community altered by harvester ant granivory in a semiarid savanna. *Oikos*.

NONPEER-REVIEWED GOVERNMENT PRODUCTS

Nicolai, N. Small mammal communities in the parks of San Diego County, CA. *Cal. Dept. of Fish and Game, San Diego, CA*.

Nicolai, N. Results of a three year study on gravel mining rehabilitation techniques. *USDI, Bureau of Land Management, El Centro, CA*.

Nicolai, N. Impact assessment on rare and endangered wildlife species habitat (vertebrates and invertebrates) and population viability with an avoidance, mitigation and conservation zone plan. in *Northeastern Colorado Desert Management Plan 2000*. *USDI, Bureau of Land Management, Riverside, CA*.

Nicolai, N. Wildlife habitat and rare species assessment. in *Superstition Mountain off-highway vehicle racing Environmental Assessment*. *USDI, Bureau of Land Management, El Centro, CA*.

Nicolai, N. Yuha Desert route rehabilitation Environmental Assessment. *USDI, Bureau of Land Management, El Centro, CA*.

Nicolai, N. Mule deer guzzler (water source) construction Environmental Assessment. *USDI, Bureau of Land Management, El Centro, CA*.

Nicolai, N. Assessment of impacts to rare and endangered species habitat and populations with mitigation measures. in *Mesquite Mine Environmental Impact Statement*. *USDI, Bureau of Land Management, El Centro, CA*.

Nicolai, N. Wildlife habitat and flat-tailed horned lizard population assessment and mitigation measures. *in* Gibson sand mining development Environmental Assessment. USDI, Bureau of Land Management, El Centro, CA.

Nicolai, N. Wildlife habitat and endangered species assessment and mitigation. *in* Picacho gravel mining development Environmental Assessment. USDI, Bureau of Land Management, El Centro, CA.

Nicolai, N. Jacumba Wilderness route rehabilitation Environmental Assessment. USDI, Bureau of Land Management, El Centro, CA.

GRANTS

Nationally Competitive Grants:

Wetland Restoration; *U.S. Fish and Wildlife Service*, \$25,000. PI.

Obtained first restoration project for rare 50-acre fen in New Mexico. The project included mentoring 2 technicians & 1 college student from the Santo Domingo Tribe.

Conservation of Bats and Mines; *Bat Conservation International*, \$43,300. PI.

Conducted an inventory of eastern San Diego County, CA mines for bat roosts and restored a mine that harbors both hibernacula and maternity roosts for two rare species. Completed in three years.

Grant-in-Aid of Research; *Sigma Xi*, \$2,000. PI.

Equipment and supplies for Master's Thesis research. Completed in one year.

Algodones Dunes Watchable Wildlife Area; *Fish and Wildlife Foundation*, \$7,500. PI.

A nationally-recognized Watchable Wildlife Area was created.

San Felipe Creek Restoration; *Fish and Wildlife Foundation*, \$38,900. PI.

Restored wetland habitat for an endangered species.

East Mesa Horned Lizard Habitat Restoration; *Fish and Wildlife Foundation*, \$9,332. PI.

Restoration of *Phrynosoma mcallii* habitat in partnership with the local power district.

State-wide Competitive Grants:

Research Flat-tailed Horned Lizard; *California Off-Highway Vehicle Commission*, \$77,000. PI.

Conducted a 2-year study of life history traits in flat-tailed horned lizards.

Imperial Sand Dunes Monitoring; *California Off-Highway Vehicle Commission*, \$42,000. Co-PI.

Conducted 2-year monitoring study of rare and endangered plants, and inventoried endemic invertebrates utilizing museum records and field collections.

San Felipe Creek Wetlands Rehabilitation; *CA Department of Fish and Game*, \$14,000. PI.

Rehabilitated illegal and closed roads in a sensitive riparian area with endangered fish habitat. The project included the help of twelve California Conservation Corp. personnel.

Effects of Fire on Small Mammals in Coastal Sage Scrub; *San Diego County Game and Fish Commission*, \$1,100. PI.

Studied the influence of fire on small mammal populations. Completed in one year.

Texas A&M University Competitive Grant:

Graduate Student Research and Presentation Grant; *Texas A&M University*, \$500. Co-PI.

In collaboration with the Texas Forestry Department, conducted aerial photography of ant habitat for dissertation research.

Unfunded Research Competitive Grants:

Pre-Doctoral NSF, Doctoral NSF, Ecology NSF, NOAA Environmental Doctoral, Restoration Ecology, Israel Ecology Postdoctoral, CREES Rangeland, USDA New Technologies Research, and T&E, Inc. Start-up Research

PROFESSIONAL PRESENTATIONS

INVITED PRESENTATIONS

- Do harvester ants facilitate or stress grasslands after disturbances?, Department of Biology, Brown Bag Seminar, University of New Mexico, 2010.
- Do harvester ant nests facilitate grassland recovery after drought in long-term grazing regimes?, Ziv Symposium on Invertebrate Conservation, Israel, 2006.
- Harvester ants alter dynamics of rangeland savanna: nest construction and granivory, Department of Ecology Seminars, Ben-Gurion University of Negev, Israel, 2006.

PRESENTATIONS

- Timing is everything: seed predation and indirect facilitation by ants alter seedling establishment following drought. Ecological Society of America, 2009.
- Shift in seed availability due to harvester ant nest formation and granivory in Israel. British Ecological Society, 2009.
- Seed rain variation due to nest formation and granivory by harvester ants in a semi-arid shrubland, Israel. Ecological Society of America, 2008.
- Does grazing restore mid-continent flyway wetlands?, Environmental Protection Agency Wetlands and Waterways Conference, 2008.
- The role of seed limitation and microsite traits in seedling establishment, Ecological Society of America, 2007.
- Do animal-created patches facilitate prairie recovery following drought?, The Wildlife Society conference, 2007.
- Promising facilitation of grassland recovery by harvester ants determined by modified Ripley's K spatial analysis, Ecological Society of America, 2005.
- Interaction between season and plant composition as seed preference by *Pogonomyrmex barbatus*, red harvester ant, Am. Assoc. for the Advancement of Science/Southwestern Div., Tucson, 2005.
- Do harvester ants facilitate rangeland recovery following droughts?, Society for Range Management conference, 2005.
- Red harvester ant nests as source of grassland recovery after drought in a southern mixed prairie, Southwestern Association of Naturalists conference, 2004.
- Harvester ant nests as grass refugia during a severe drought on the Edwards Plateau, Texas, Southwestern Association of Naturalists conference, 2003.

ACADEMIC SERVICE

- Taught a field day for Desert Biology course, St. Olaf University undergraduates, Sevilleta LTER Program, University of New Mexico.
- Manuscript referee for Ecological Modelling, Ecography, Journal of Arid Environments, and Plant Ecology & Diversity.
- Organized Range Department seminars and invited speakers, University of Nebraska.

- Chair, Departmental Graduate Student Committee on Conference Travel, Texas A&M University.

COMMUNITY SERVICE

Ecology Volunteer, New Mexico Wind Energy Working Collaboration.
Wrote chapter on wind-energy development impacts to small mammals and the ecosystems they depend upon for entire state. Co-wrote chapter on amphibian and reptile populations. Created management practices as part of a multi-organizational, multi-disciplinary team.

Ecologist, Santo Domingo Pueblo, New Mexico.
Led drive to restore water flow to unique fen on reservation. Created presentation for tribal community, governor, and council presented by **2 tribal biology students I mentored**.

Park Volunteer, Snowdonia National Park, Wales.

Wildlife Research Volunteer, World Wildlife Fund, Italy.

Member of the Board of Directors, Salton Sea International Bird Festival.

Educator, Organized and Led International Migratory Bird Day.

Educator, Taught Wildlife Class for local 4-H.

Wildlife Educator, Easter Day-in-the-Desert.

Founding Member, Otay Mesa Conservation Society.

PERSONAL

Have a conservation orientation in most everyday and professional undertakings. Enjoy traveling, snorkeling, hiking, gardening, and playing the violin.