National Park Service
U.S. Department of the Interior

FINDING AID

# KEVIN P. WILSON PAPERS

1999-2007

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Death Valley National Park
PO Box 579, Death Valley, CA 92328
Death Valley, CA

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***Rights Statement for Archival Description***


# *COLLECTION SUMMARY*

**Catalog Number**: DEVA 66592

**Collection Number**: 66592

**Title**: Kevin P. Wilson papers

**Dates**: 1999-2007

**Extent**: 1.7 linear feet

**Creator**: Kevin P. Wilson

**Languages and Scripts**: Collection is in English and script is Latin

**Custodial History**: Created by Kevin P. Wilson during the research and writing of his thesis and later donated to Death Valley National Park by Wilson.

# *COLLECTION CONTENT AND STRUCTURE*

## Scope and Content Note

This collection contains research, data, and supporting documentation related to Kevin P. Wilson's thesis titled *Role of Allochthonous and Autochthonous carbon in the Food Web of Devils Hole, Nevada*. It also includes a final draft of the thesis itself. The abstract of this thesis is:

We measured the seasonal input of allochthonous and autochthonous carbon in Devils Hole, NV, for a 15-month period to determine the seasonal importance of each throughout the year in the diet of the listed, endemic population of the Devils Hole pupfish, *Cyprinodon diabolis*. Physico-chemical parameters were measured at bimonthly intervals and light energy was monitored continuously during the study. Approximately 80% of the total light energy entered the cavernous, light-limited spring-pool.as indirect light (<135 μE/$m^2$/s) with no significant energy difference in indirect light throughout the year. Direct light reached the water surface for a maximum of 4 h in June and no light reached the water surface from late November to mid-February. The physico-chemical environment in Devils Hole is very constant. Water temperature ranged from 33.2 to 33.6°C both spatially and temporally in the open-cavernous spring-pool while pH ranged from 7.1 to 7.6 during the year.

Average daily input of allochthonous carbon was 0.051 g (±0.02) g AFDM/$m^2$/day with the highest daily values measured in the summer, July= 0.26 (±0.19) and the

lowest in winter, January= 0.002 (±0.0007). Autochthonous biomass was highest in the summer and early fall ranging from 50.8 (±14.7) in August to 55.4 (±16.3) g AFDM/$m^2$ in October.

Net primary production estimates for indirect light were variable over the study and reached a maximum of 3.8 (±0.6) mg $O_2/m^2/h$ in April. Direct light estimates were also highest in April reaching 35.0 (±2.9) mg of $O_2/m^2/h$.

The most common item in the digestive tract of *C. diabolis* throughout the year was inorganic particulate matter ($CaCO_3$), making up 63% of the contents. *Denticula elegans* made up 12%, other diatoms 10%, and detritus 1% of the composition and macroinvertebrates made up the balance.

Stable isotope analyses suggested that the $\delta^{13}C$ signal of *Cyprinodon diabolis* shifted seasonally, being more enriched in the summer (-25 to -24‰, autochthonous), and more depleted in the winder (-28 to -24‰, allochthonous). Analysis of $\delta^{15}N$ revealed the top predator to be the flatworm, *Dugesia dorotocephala*, which ranged from 8.5 to 12.0‰ $\delta^{15}N$ compared to C. diabolis which ranged from 8.0 to 10.5‰. The importance of allochthonous input into light-limited spring-pool ecosystems is discussed.