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
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Death Valley, CA

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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.