

### Abstract

This paper quantifies two important native forest ecosystem services in southern Chile: water supply and recreational fishing opportunities. We analyzed streamflow in relation to forest cover in six watersheds located in the Valdivian Coastal Range (39°50'–40°05'S), the effect of forest management on streamflow in two watersheds in the Valdivian Andes (600–650 m of elevation; 39°37'S), and fish abundance as a function of forest cover in 17 watersheds located in the Coastal Range and the Central Depression (39°50'–42°30'S). We found that the annual direct runoff coefficient (quickflow/precipitation) and total streamflow/precipitation in the dry summer season were positively correlated with native forest cover in the watershed (R<sup>2</sup> = 0.67 and 0.76; \*P = 0.045 and 0.027, respectively) during four years of observations. Conversely, a negative correlation was found between summer runoff coefficients (total streamflow/precipitation) and cover of *Eucalyptus* spp. and *Pinusradiata* plantations (R<sup>2</sup> = 0.84; \*P = 0.010). We estimated a mean increase of 14.1% in total summer streamflow for every 10% increase in native forest cover in the watershed. The analysis of streamflow changes between two paired watersheds dominated by native secondary *Nothofagus* stands, one thinned with 35% of basal area removal and a control, showed that the former had a 40% increase during summer (four years of observations). The best correlation between fish abundance and forest cover was found between trout abundance (%) and secondary native forest area in 1000 m × 60 m stream buffers (R<sup>2</sup> = 0.65, \*\*\*P < 0.0001). We estimated a 14.6% increase in trout abundance for every 10% increase of native forest cover in these buffers. Similar approaches to quantify forest ecosystem services could be used elsewhere and provide useful information for policy and decision-making regarding forest conservation and management.

### Keywords

Ecosystem services; Streamflow; Water supply; Recreational fishing; Forest policy; Valdivian Rainforest Ecoregion; Climatic change mitigation

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#### 1. Introduction

#### 2. Study area



### Table 1

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##### 3.2. Streamflow and forest cover

##### 3.3. Forest management and streamflow

##### 3.4. Fish abundance and forest cover

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##### 4.1. Land use and forest cover

##### 4.2. Streamflow and forest cover

