

# JAPANESE WATERSHEDS CHARACTERIZATION FROM AN ECOREGION POINT OF VIEW FOR ECOSYSTEM MANAGEMENT

CHEN Siew Fong

*Key Words: Ecoregion, watershed characterization, hierarchical land planning*

## 1. INTRODUCTION

This dissertation suggests a new multi-purpose, ecologically-significant planning unit in Japan based on the concept of ecoregions; groups of geographical areas of similar functioning ecosystems (Omernik & Bailey, 1997) and using it to characterize Japan's topographic watersheds on a nationwide scale to find its potential in ecosystem management

## 2. METHODOLOGY

### (1) Ecoregion delineation at two spatial scales using key delineator

Ecoregion I (macroscale): Map overlay of Japan Climate Regime with Fossa Magna and Median Tectonic Line as framework for analysis.

Ecoregion II (mesoscale): Map overlay of Japan's major landform classes and major geological classes, and reclassification into 7 classes.

### (2) Characterization of Japan's watersheds

Watershed data were created from 50m DEM data (Geographical Survey Institute). Both size distribution of individual watersheds and Ecoregion II types in relation to Ecoregion I types were calculated separately using Zonal Statistics (ArcMap 9.3, ESRI Japan) to characterize watersheds at both spatial scale.

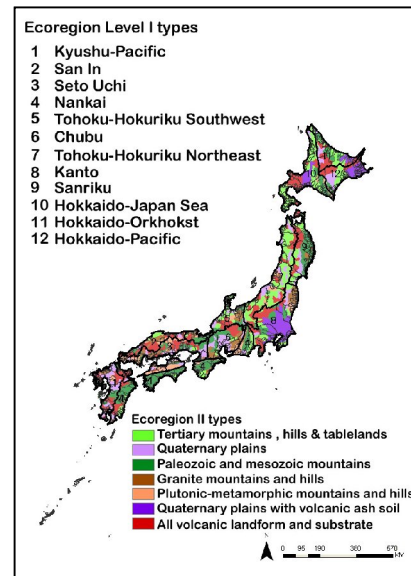


Figure 1 Configuration of Ecoregion I, Ecoregion II and watersheds

## 3. RESULTS

Figure 1: Southwest (SW) Japan is dominated by volcanic, plutonic-metamorphic and granitic mountains of Paleozoic-Mesozoic era in relation to Ecoregion II types. Northeast (NE) Japan and Hokkaido consist mainly of Tertiary era mountains and Quaternary era plains. Figure 2: Watershed sizes in Southwest Japan are mostly small (<2000km<sup>2</sup>). Hokkaido has medium-sized watersheds (4000-5000km<sup>2</sup>) and Northeast Japan has large watersheds (6000-8000km<sup>2</sup>). Watersheds size distributions coincide with spatial distribution of dominant Ecoregion II types.

## 4. DISCUSSION

The geologic timeline of Japan's formation and the post-glacial rainfall separated Japan 2 regions of different geological history and watershed sizes: SW Japan and NE Japan. SW Japan has older terranes and smaller, eroded watersheds; while NE Japan and Hokkaido has newer terranes and large, stable watersheds. The results imply that watersheds distribution are related to ecoregions and is a suitable framework for country-wide ecosystem management.

## CITATION

Omernik, J. M., Bailey, R. G (1997). Distinguishing Between Watersheds and Ecoregion. JAWRA No. 96178, pp. 935-949

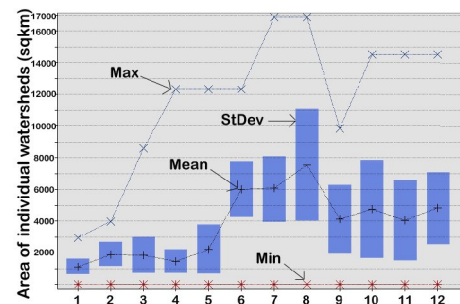


Figure 2 Distribution of individual watersheds in each Ecoregion Level I units