Journal of Global Change Data & Discovery. 2023, 7(1): 89-93
www.geodoi.ac.cn

In Situ Vegetation Dataset from 28 Plots in Qinghai Lake Basin (2019)

Wang, X.[1,3] Wang, X. Y.[2*] Yang, X. Y.[1,4] Li, L.[1,3] He, Y. B.[5] Sun, J. Q.[5] Shi, Q. Q.[5]

1. Qinghai Provincial Key Laboratory of Geospatial Information Technology and Application, Xining 810001, China;
2. Qinghai Lake Wetland Ecosystem National Research Station, Gangcha 812300, China;
3. Qinghai Geographic Information Industry Development Co., LTD., Xining 810001, China;
4. Qinghai Remote Sensing Center for Natural Resources, Xining 810001, China;
5. Qinghai Lake National Nature Reserve Administration, Xining 810001, China

Abstract: The Qinghai Lake basin, located northeast of the Qinghai-Tibet Plateau, is a significant natural and geographical ecological protection area. It forms a crucial component of the ecological security pattern known as the “two screens and three regions” in Qinghai province. Being a comprehensive natural and social complex ecosystem with diverse ecological and geographical elements, the Qinghai Lake basin is among the 35 priority areas in China for biodiversity conservation. Additionally, it serves as an important gene bank for plateau biological resources. In 2019, this paper’s authors and other researchers conducted a vegetation monitoring study in the basin, focusing on 28 sample locations. The study collected various data, such as vegetation type, height, coverage, and biomass, and information on plant families, genera, and species. This paper presents the 2019 vegetation monitoring dataset for the Qinghai Lake basin, which includes the following components: (1) profiles of the monitoring samples, including geographic information system data for their locations; (2) vegetation type structure, covering temperate steppe, temperate desert steppe, alpine steppe, temperate desert, mountain meadow, lowland meadow, and alpine meadow; (3) quantitative statistics on 16 major plant families, genera, and species that represent zonal vegetation; (4) statistics on vegetation biomass and available biomass in the Qinghai Lake Nature Reserve and the active area of the Przewalski gazelle; and (5) annual comparisons of plant structure and biomass among temperate steppe, temperate desert steppe, alpine steppe, and temperate desert. The dataset consists of 9 data files with data size of 86.6 KB.

Keywords: Qinghai Lake basin; vegetation monitoring; 2019

DOI: https://doi.org/10.3974/geodp.2023.01.12

CSTR: https://cstr.escience.org.cn/CSTR:20146.14.2023.01.12

Dataset Availability Statement:

The dataset supporting this paper was published and is accessible through the *Digital Journal of Global Change Data Repository* at: https://doi.org/10.3974/geodb.2021.10.04.V1 or https://cstr.escience.org.cn/CSTR:20146.11.2021.10.04.V1.

Received: 06-07-2022; **Accepted:** 10-03-2023; **Published:** 25-03-2023

Foundation: Open project of Qinghai Provincial Key Laboratory of Geospatial Information Technology and Application (QHDX-2023-02)

***Corresponding Author:** Wang. X. Y., Qinghai Normal University, 245003744@qq.com

Data Citation: [1] Wang, X., Wang, X. Y., Yang, X. Y., *et al*. *In situ* vegetation dataset from 28 plots in Qinghai Lake basin (2019) [J]. *Journal of Global Change Data & Discovery*, 2023, 7(1): 89–93. https://doi.org/10.3974/geodp.2023.01.12. https://cstr.escience.org.cn/CSTR:20146.14.2023.01.12.

[2] Wang, X. Y., Sun, J. Q., Chen, K. L., *et al. In situ* dataset on vegetation from 28 sample sites in Qinghai Lake basin (2019) [J/DB/OL]. *Digital Journal of Global Change Data Repository*, 2021. https://doi.org/10.3974/geodb.2021.10.04.V1. https://cstr.escience.org.cn/CSTR:20146.11.2021.10.04.V1.

1 Introduction

The Qinghai Lake basin, situated in the semi-arid plateau area on the northeast margin of the Qinghai-Tibet Plateau, represents a significant geographical ecotone in China[1]. The basin's flowing water system possesses complex and diverse characteristics[2], playing a crucial role in curbing desertification and safeguarding the ecological security of the Hehuang Valley agricultural area[3]. Moreover, the species richness within the Qinghai Lake basin surpasses that of the Qinghai-Tibet Plateau, with 775 identified seed plant species accounting for 32.60% of the province's total[4]. The topography of the Qinghai Lake area is characterized by high altitude and substantial relative elevation differences. Additionally, the presence of the vast Qinghai Lake and diverse landforms contribute to the regulation of the local climate, resulting in pronounced variations in natural environmental factors such as water, heat, and soil within the basin. The natural vegetation in the area encompasses five types, namely shrubland, steppe, desert, intergrass, and marsh and aquatic vegetation, primarily consisting of warm steppe, warm desert steppe, and alpine marsh meadow near the lake shore[5,6]. The basin holds significant ecological value and serves as a crucial grassland animal husbandry production base on the Qinghai-Tibet Plateau[7], supporting the region's economic development in this sector. Therefore, monitoring and investigating the status of the grassland ecosystem in the Qinghai Lake basin is of utmost importance for ecological environment protection, sustainable grassland utilization, and the advancement of animal husbandry on the plateau.

This dataset is derived from the vegetation monitoring sample points[8] of the Qinghai Lake National Nature Reserve Administration (Figure 1), spanning multiple years. The monitoring period for this specific dataset ranges from August 2 to August 12, 2019. Monitoring was conducted at 28 fixed points, including locations such as Daotang River wetland, Ganzi River, Anhuan Lake, Ganzi River wetland, Hada Tan, Hargai, Haixin Mountain slope, Heima River wetland, Heima River towards Hu village, Hudong sheep farm, Jiermeng, Jiangxi Gulxiashe village, Ketu, Kuerma, Cormorant island summit, Qingbaya Huo, Quanwan wetland, Shadao East, Shadao wetland, Shaliu River, Shengge, Talexuan Guo, Xianggong village, and Xiao Bohu and Yuanzhe.

2 Metadata of the Dataset

Table 1 presents the metadata information for the *In situ* dataset on vegetation from 28 sample sites in Qinghai Lake basin (2019) [9].

3 Vegetation Monitoring Methods

The vegetation monitoring points primarily consist of ground monitoring points established in accordance with the objectives of vegetation investigation and monitoring within the Qinghai Lake Nature Reserve. These monitoring points are strategically positioned based on the technical requirements for point layout, resulting in the establishment of a comprehensive vegetation monitoring network within the Qinghai Lake area.

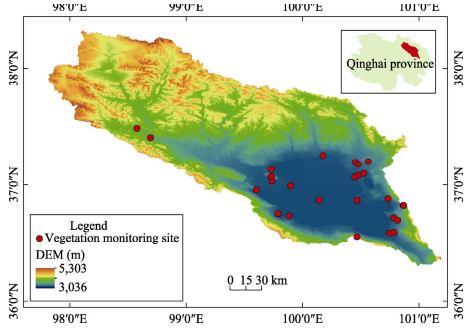

Figure 1 *In situ* monitoring map of Qinghai Lake basin in 2019

3.1 Rules for Setting Monitoring Points

(1) The selected plots were chosen to exhibit typical environmental and vegetation charac teristics

representative of their respective distribution types. The vegetation composition and taxonomy were carefully assessed to ensure accurate type classification.

Table 1 Metadata summary of *In situ* dataset on vegetation from 28 sample sites in Qinghai Lake basin (2019)

Article	description		
Dataset name	*In situ* dataset on vegetation from 28 sample sites in Qinghai Lake basin (2019)		
Dataset short name	VegetationQinghaiLakeBasin2019		
Authors	Wang, X. Y., Qinghai Lake Wetland Ecosystem National Positioning Observation and Research Station, Qinghai Province, 245003744@qq.com Sun, J. Q., Qinghai Lake National Nature Reserve Administration, 625764587@qq.com Chen, K. L., Qinghai Normal University, ckl7813@163.com Chen, Z. R., Qinghai Normal University, 2776246502@qq.com Ma, Y. X., Qinghai Normal University, 346404980@qq.com		
Geographical area	Qinghai Lake basin	Data year	2019
Data format	.shp, .xlsx	Data sizes	86.6 KB
Data files	Consists of nine data files		
Foundations	Qinghai Province (2020-ZJ-Y06); Ministry of Science and Technology of P. R. China (2019QZKK0405); National Natural Science Foundation of China (41661023)		
Data publisher	Global Change scientific research data publishing System http://www.geodoi.ac.cn		
Address	No. 11A, Datun Road, Chaoyang District, Beijing 100101, China		
Data sharing policy	***Data*** from the Global Change Research Data Publishing & Repository includes metadata, datasets (in the *Digital Journal of Global Change Data Repository*), and publications (in the *Journal of Global Change Data & Discovery*). ***Data*** sharing policy includes: (1) ***Data*** are openly available and can be free downloaded via the Internet; (2) End users are encouraged to use ***Data*** subject to citation; (3) Users, who are by definition also value-added service providers, are welcome to redistribute ***Data*** subject to written permission from the GCdataPR Editorial Office and the issuance of a ***Data*** redistribution license; and (4) If ***Data*** are used to compile new datasets, the 'ten per cent principal' should be followed such that ***Data*** records utilized should not surpass 10% of the new dataset contents, while sources should be clearly noted in suitable places in the new dataset[10]		
Communication and searchable system	DOI, CSTR, Crossref, DCI, CSCD, CNKI, SciEngine, WDS/ISC, GEOSS		

(2) During the plot selection process, particular attention was given to capturing the various patterns and trends of dominant species and community-building species within the main vegetation types.

(3) For the various vegetation types distributed along the vertical spectrum of the mountains, sample plots were established in the middle of each vertical distribution belt, maintaining relative consistency in slope, slope direction, and slope position. In flat areas, plots were positioned on the flattest sections. For plots within shrublands, the selection was made in areas with moderate shrubland coverage.

(4) In sections with concealed or obscured regional vegetation distributions, sample plots were placed in areas with relatively uniform environmental conditions within that section.

(5) Sample plots were distributed across different geomorphic types to comprehensively represent the various vegetation types found under distinct terrain and topographic conditions.

3.2 Field Monitoring

The investigation encompassed vegetation types, bird populations, and Przewalski's antelope populations at the sites mentioned above. For the vegetation type survey and monitoring, representative sample sites were selected within each region as the focus of vegetation assessment. Detailed records were made, including the administrative region of the sample sites, vegetation type, altitude, geographic location, landform characteristics, soil properties, hydrological conditions, hydrogeological conditions, utilization methods, and utilization status. Random selection was employed to establish one vegetation structure sample and ten plant frequency samples. Aboveground vegetation biomass was measured in Przewalski's antelope habitats and breeding sites. Bird and Przewalski's antelope populations were surveyed and recorded using single and binocular observations. Additionally, plant specimens were collected during the investigation.

Following sample selection principles, 28 vegetation survey and monitoring points were established within the Qinghai Lake Nature Reserve. The primary focus of these points was

on the habitats and breeding grounds of birds within the reserve. Accordingly, the vegetation types selected for surveying were primarily those closely associated with bird habitats and breeding grounds, such as the wetlands surrounding Qinghai Lake. Most of the samples consisted of marshes and salt meadows, while a smaller portion represented warm grassland vegetation types.

4 Data Results

4.1 Dataset Composition

The dataset includes the following: (1) monitoring plot profile and plot location data; (2) vegetation types (temperate steppe, temperate desert steppe, alpine steppe, temperate desert, mountain meadow, lowland meadow, and alpine meadow); (3) quantitative statistics of 16 major plant families, genera, and species of zonal vegetation; (4) statistics of vegetation biomass and available biomass in Qinghai Lake Nature Reserve and Przewalski gazelle active area. (5) annual comparison of plant structure and biomass in temperate steppe, temperate desert steppe, alpine steppe, and temperate desert. The dataset was archived in .shp and .xlsx formats and consists of nine data files totaling 86.6 KB (compressed into two files of 74.9 KB).

4.2 Data Results

(1) In this survey, a total of 28 sample sites were established across 25 regions, including Egg island, Cormorant island, and Haixinshan island (Figure 1). These sample sites consisted of seven sites categorized as warm steppe, one site as warm desert steppe, two sites as alpine steppe, two sites as warm desert, one site as mountain meadow, one site as lowland meadow, and 14 sites as alpine meadow.

(2) The vegetation monitoring results are as follows: the average height of the reproductive branches of plants was 22.2 cm, while the height of the dominant species was 29.9 cm. The height of vegetative branches measured 12.0 cm, with the dominant species reaching a height of 13.9 cm. The total vegetation coverage was 76%, and the coverage of dominant species was 29%, which is 4% higher than that of 2018. The vegetation biomass recorded was 2,117.12 kg/hm^2, with grasses and Cyperaceae accounting for 54.79% of the total. Notably, the vegetation biomass experienced a decrease of 33.76% compared to 2018, which could be attributed to the low rainfall observed in 2019.

(3) In 2019, the vegetated livestock carrying capacity in the active area of Przewalski showed a significant increase of 47.54% compared to 2018, reaching a total of 134,821 sheep units. Among the active areas, the Hudong active area exhibited the highest carrying capacity, capable of supporting 91,418 sheep units. This marked an increase of 57,932 sheep units compared to the previous year. On the other hand, the Cormorant island activity area had the lowest carrying capacity, accommodating only 1,509 sheep units.

(4) When comparing the vegetation biomass of the seven different vegetation types with the average values observed over the years, certain types, such as Achnatherum, Stipa, and Stipa with golden dew, displayed an increasing trend. However, the biomass of other vegetation types exhibited a decreasing trend. Considering the vegetation growth across the entire region, it was still considered a favorable year. Nevertheless, specific areas, like the Ganzi River area, have experienced drought and water scarcity, resulting in sparse vegetation growth and consistently low biomass yield. Furthermore, the vegetation on Haixinshan Island has been subject to long-term restrictions, leading to the accumulation of a substantial layer of dead vegetation that hinders the normal growth and development of plants. Consequently, the height, coverage, and biomass of vegetation on the island have experienced varying degrees of decline.

(5) The average total ground biomass of the ten vegetation types in Qinghai Lake Nature Reserve was recorded at 2,153.3 kg/hm^2. Among these, grasses contributed significantly,

with a biomass of 1,128.3 kg/hm^2, accounting for 52.04% of the total biomass. Seperaceae accounted for 96.7 kg/hm^2, making up 4.46% of the total. Legumes registered a biomass of 162.9 kg/hm^2, representing 7.51% of the total, while other plants had a biomass of 780.4 kg/hm^2, constituting 35.99% of the total biomass.

5 Discussion

According to the vegetation monitoring sample points of the Qinghai Lake National Nature Reserve Administration over the years, 28 sample sites were established in 25 regions, such as Guandao island, Cormorant island, and Haixinshan island, for a period of 11 days from August 2, 2019, to August 12, 2019 (Figure 1). Among these sites, seven were temperate grasslands, one was a temperate desert grassland, and two were alpine grasslands. Additionally, there were two warm desert samples, one mountain meadow sample, one lowland meadow sample, and 14 alpine meadow samples. Plant classification and identification are crucial aspects of the vegetation survey and monitoring process. Accurate identification of vegetation species and names is a significant technical challenge. Therefore, the expertise of vegetation monitoring workers in plant classification and identification is of utmost importance.

Furthermore, vegetation monitoring should be integrated with the ecological environment protection and comprehensive treatment project of Qinghai Lake to collectively accomplish the ecological monitoring of vegetation. This will provide a scientific foundation for the protection and comprehensive treatment project of Qinghai Lake's ecological environment. Serving as the fundamental dataset for vegetation research in the Qinghai Lake basin, this dataset can serve as a reference for studying ecological remote sensing and other related subjects in the basin. It can also provide a data basis for the Qinghai Lake basin's response model to global changes and offer a scientific groundwork for the ecological construction, vegetation restoration, and sustainable development of the Qinghai Lake basin.

Author Contributions

Wang, X. and Wang, X. Y. did the overall design for the development of the dataset; Yang, X. Y., Li, L., Sun, J. Q., Shi, Q. Q. and He, Y. B. collected and processed all the data. Wang, X. wrote the data paper.

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Zhang, Z. X. Qinghai Geography [M]. Xining: Qinghai People's Publishing House, 2004

[2] Chen, K. L., Li, S. C., Zhou, Q. F., *et al*. Dynamic change of landscape structure and its impact on ecosystem service function in Qinghai Lake basin in recent 25 years [J]. *Resources Science*, 2008(2): 274–280.

[3] Wang, Z. F., Xie, J., Liu, X. T., *et al*. Study on the relationship between vegetation coverage and water body area in Qinghai Lake basin [J]. *Environmental Science Guide*, 2019(S2): 10–14.

[4] Liu, C. M., Yue, J. B. Analysis on conformity evaluation of National park establishment: a case study of the proposed Qinghai Lake National Park [J]. *Wetland Science and Management*, 2019, 17(3): 49–53.

[5] Chen, G. C., Peng, M. Vegetation and its distribution in Qinghai Lake area [J]. *Chinese Journal of Plant Ecology and Geobotany*, 1993(1): 73–83.

[6] Peng, M., Chen, G, C. Study on vegetation evolution trend in Qinghai Lake area [J]. *Chinese Journal of Plant Ecology and Geobotany*, 1993(3): 27–33.

[7] Zhang, B. C., Bai, Y. F. Ecological status and genetic analysis of grassland in Qinghai Lake [J]. *Heilongjiang Animal Husbandry and Veterinary Science*, 2015(15): 142–144.

[8] Wang, X. Y., Sun, J. Q., Chen, K. L., *et al. In situ* dataset on vegetation from 28 sample sites in Qinghai Lake basin (2019) [J/DB/OL]. *Digital Journal of Global Change Data Repository*, 2021. https://doi.org/10.3974/geodb.2021.10.04.V1. https://cstr.escience.org.cn/CSTR:20146.11.2021.10.04.V1.

[9] GCdataPR Editorial Office. GCdataPR data sharing policy [OL]. https://doi.org/10.3974/dp.policy.2014.05 (Updated 2017).