REMOTE SENSING AVAILABLE IN ECOLOGICAL MONETARY VALUE ASSESSMENT OF SAND BEACH

Xie HongYu [a],

[a] Wuhan Environmental Protection Bureau Information Center, Wuhan China
bubblefatcat@163.com

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ABSTRACT:

Sand beach ecological monetary value assessment is an important part of ecosystem monetary value assessment, because it plays an important role in Ecosystem being a type of wet land. The area of Sand beach is an important data in assessment, but its measure very difficult by traditional means because it is affected by climate, season and flow of river etc. In this paper, the author discusses how to measure the area of sand beach by remote sensing technology in this assessment. Above all, spot images of rainy season, dry season and midst season been selected according to local climate. After then, sand beach image feature been extracted and calculated area form these spot images after image process. At last, the average area of sand beach been calculated after different weight been set for area of different season according to local climate and environment factor. As a result, the area of sand beach calculated by remote sensing more efficiently than traditional means

1. INTRODUCTIONON

Sand beach (only means sand beach and sand island of river in this paper), being a type of wetland, plays an important role in Ecosystem. Its ecological monetary value assessment is an important part of ecosystem monetary value assessment, because it has very high ecological value. The area of Sand beach is an important elementary data in this assessment (Liu NianFeng, 2002), but its measure is very difficult by traditional means because its area depend on the water level of river is a variable directly affected by local climate and season transfer. It is thought that obtaining the average water level in different season and climate is the key in this measure

2. ANALYZE AND SOLUTION

2.1 Hydrology data analyze

In one year, the water level of river can be divided three seasons, rainy season, dry season and midst season, in according to flow of river that is depend on rainfall and evaporate rate in this year. This is means that the area of sand beach has three values correspond to the average water level in different season. There is dry season area and midst season area. Except that, the maximum area of sand beach must be account in this measure.

1. Dry season area: the area of sand beach exposed in river when water level is the average dry season water level. It is obtained by emerged area of sand beach in average dry season water level minus emerged area in average rainy season water level.
2. Midst season area: the area of sand beach exposed in [1]river when water level is the average midst season water level. It is obtained by emerged area of sand beach in average midst season water level minus emerged area in average rainy season water level.
3. The maximum area: the area of sand beach exposed in river when water level is the lowest water level in history. It is obtained by emerge area of sand beach in lowest water level minus emerge area in highest water level.

2.2 Measure solution

After analyzing data of hydrology, the dates of above water level occurring were chosen. The satellite images would be chosen in according to these date. Unfortunately, the image of water level occurring often can't be obtained, because satellite had no been invented at all in these dates. In general, the images in that time of approximate to these water levels would be chosen to be replacement.

In addition, the river need to been divided many section because length of river is too longer so as to can't be represented by ones.

After chosen image, all of image must be complete geometry correction and image improvement. And then, polygons that represented sand beach were generated after riverside and boundary of sandbank were extracted from these images. At last, area of sand beach obtained by calculated area of polygons

3. EXPERIMENT

The example is about how to measure sand beach area of Han River XiangYang section. Its dry season from October to February, midst season form March to May and rainy season form June to September.

3.1 Water level data analyze

Appropriate water level time need to been determined by analyzing hydrology data. The next three tables are Han River XiangYang section month average water level, annual average and maximum and minimum of year from 1989 to 1999(Huang Sea Height/ meter)(XiangFan city Hydrology Bureau,2000).

[1]Corresponding Author. E-mail: bubblefatcat@163.com

Table 1 Han River XiangYang section January-June month average water level from 1989 to 1999 (Huang Sea Height/ meter)

Ye	Jan	Feb	Mar	Apr	May	Jun
1989	61.22	61.57	61.95	62.03	62.41	62.71
1990	61.36	61.78	61.80	62.04	62.26	62.55
1991	60.80	60.72	61.08	61.20	61.28	62.00
1992	60.52	60.49	60.57	61.05	61.23	61.34
1993	61.41	61.60	61.69	61.80	62.01	62.04
1994	61.07	61.08	61.20	61.20	61.71	61.33
1995	61.21	61.02	60.87	60.73	60.63	60.70
1996	61.15	60.82	60.95	60.94	61.13	61.49
1997	61.55	61.21	61.07	61.25	61.38	61.18
1998	59.92	59.87	60.12	60.56	60.95	60.97
1999	60.37	60.39	60.44	60.41	60.63	60.51
Average	60.96	60.96	61.07	61.20	61.42	61.53

Table 2 Han River XiangYang section Jul-December month average water level from 1989 to 1999 (Huang Sea Height/ meter)

Ye	Jul	Aug	Sep	Oct	Nov	Dec
1989	63.71	62.89	62.87	61.47	60.98	61.07
1990	63.47	62.49	61.93	61.02	60.79	60.71
1991	62.61	62.65	61.87	60.80	60.52	60.37
1992	62.08	61.96	61.40	61.16	61.22	61.03
1993	61.95	62.08	61.97	61.10	60.88	60.73
1994	61.84	61.97	60.98	60.60	60.64	60.73
1995	60.88	61.06	61.00	61.06	61.04	61.00
1996	62.06	62.46	61.51	61.13	62.55	61.52
1997	61.25	61.33	60.71	60.31	60.22	60.19
1998	62.30	63.65	62.31	60.78	60.51	61.41
1999	60.72	60.61	60.31	60.29	60.10	60.09
Average	62.08	62.10	61.53	60.88	60.86	60.80

Table 3 Han River XiangYang section annual average, maximum and minimum water level from 1989 to 1999 (Huang Sea Height/ meter)

Ye	Average	Max	Min
1989	62.08	66.12	60.65
1990	61.85	65.21	60.39
1991	61.33	64.93	60.04
1992	61.17	62.60	60.23
1993	61.61	63.64	60.41
1994	61.20	62.82	60.40
1995	60.93	62.16	60.48
1996	61.48	65.65	60.56
1997	60.97	62.14	60.07
1998	61.04	65.07	59.78
1999	60.41	61.28	60.00
Average	61.27	63.78	60.27

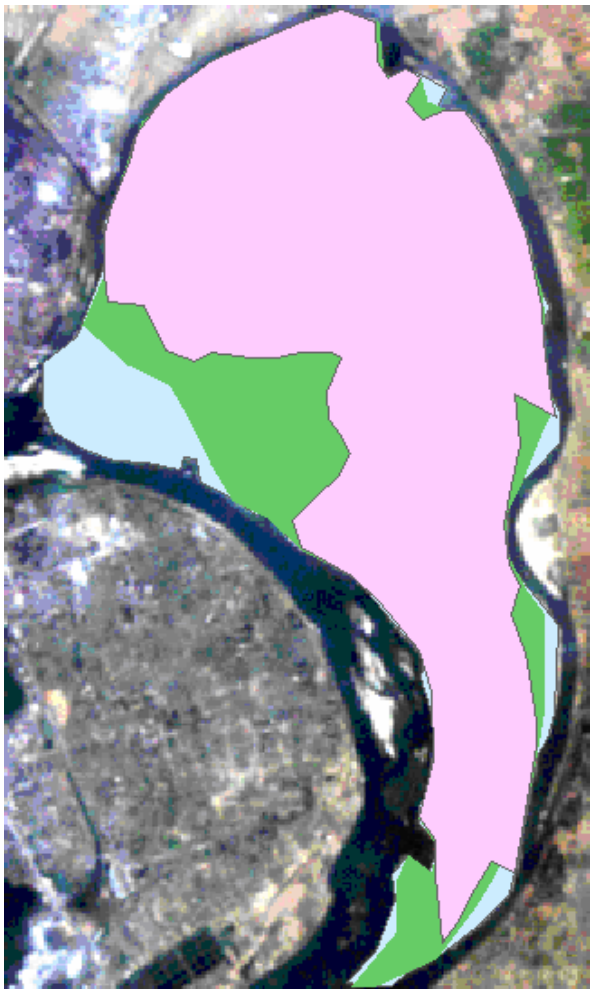
Form above table, it could be calculated that:

1. Rainy season average water level is 61.81m.
2. Dry season average water level is 60.89m.
3. Midst season average water level is 61.23m.
4. The maximum water level is 66.12, but in that time has no image because it occurred in 1989. The secondly higher water level used to be replacement that is 65.65m.

The minimum water level is 59.78m

3.2 Area of sand beach measure

The area of dry season and midst season is obtained after processing image whose water level is dry, midst and rainy season. But in this experiment, the maximum area can't be obtained because lacks of satellite image. The next picture is emerge area of island in rainy, midst and dry season:



Picture 1 Emerge area of island in rainy, midst and dry season

The emerged area of island is 20327310 square meter in rainy season average water level (represented by).

The emerged area of island is 24089651 square meter in midst season average water level (represented by).

The emerged area of island is 26418678 square meter in Dry season average water level (represented by).

The area of sand beach in dry season is 6091368 square meter.

The area of sand beach in midst season is 3762341 square meter.

4. CONCLUSION

It is concluded that area of sand beach in different season can be measured by integrate hydrology data with remote sensing data from above experiment. In above experiment, water level of river represented by average water level of three seasons that can represent the change to a great extent, but it is still not enough because water level change at any moment. It is been thought that founding the mathematics relation of real time water level and area of sand beach would have better result on basis of continuously remote sensing monitor in longer period

REFERENCE

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