



MEMORANDUM

TO: Water Resources Commission

FROM: Ivan Gall, Manager, Groundwater Section

SUBJECT: Agenda Item A, June 18, 2015
Water Resources Commission Meeting

Overview of Harney Basin Groundwater

I. Issue Statement

Over the years, the central portion of the Harney Basin in Harney County has seen significant groundwater development. In 2014, the Department took a closer look at this area, referred to as the Greater Harney Valley, and determined that groundwater pumping appears to be exceeding groundwater recharge. During this agenda item, staff will provide an overview of the estimated recharge, allocated water use, and options the Department is considering for the future.

II. Background

- A. **Policy:** In 1955 the Oregon Legislature passed the “Ground Water Act of 1955,” which codified a policy of groundwater management pursuant to the doctrine of prior appropriation, requiring a water right for most groundwater uses. In order to ensure the preservation of the public welfare, safety, and health, the Legislature has since enumerated several policies (ORS 537.525), including that “reasonably stable ground water levels be determined and maintained,” and that “depletion of groundwater water supplies below economic levels” be prevented. These policies reflect the Department’s responsibility when issuing new permits to issue permits within the capacity of the resource, and to prevent impacts on existing water right holders when authorizing the new appropriations of groundwater water.
- B. **Harney Basin:** The 5,243 square-mile Harney Basin is located in northern Harney County, the northern portion of the Malheur Lake Administrative Basin (Attachments 1 and 2). The Harney Basin has been described (Piper and others, 1939) as “... the relatively high, semi-arid plateau of southeastern Oregon, in Harney and Grant Counties. It constitutes the drainage area of the Malheur and Harney Lakes, which have no outlet to the sea.” The Greater Harney Valley area, which is about 45 percent of the Harney Basin, is an area of significant interest to the Department due to existing and proposed groundwater development. This area is approximately 2,385 square-miles (Attachment 3).

Permitted groundwater use in the Greater Harney Valley has largely been irrigation. Over the years, the Department has issued over 610 permits for primary irrigation alone in Harney County, with rapid development occurring in the 1970's and over the last 10 years. There is an estimated 95,680 acres of primary and supplemental irrigation groundwater rights in the Greater Harney Valley area, based on mapped places of use.

III. Discussion

In recent years staff recognized that groundwater levels were declining in two areas of the Greater Harney Valley. As a result, Department staff began to locate more wells for water level data collection, conducted one aquifer test, and installed two continuous recorders to measure groundwater levels hourly. In 2014, five preliminary final orders for groundwater permits were protested by WaterWatch of Oregon, based in part on aquifer capacity concern.

Following the five protested applications, the Groundwater Section delayed reviewing new applications until further review of available groundwater level data and trends could be conducted. Groundwater level trend data at different wells provide an indication of the stability of groundwater in the aquifer. Groundwater levels declining year-over-year typically means groundwater levels are not stable, either temporarily or long-term. Long-term declines indicate groundwater storage is being depleted because the amount of pumped groundwater exceeds the capacity of the resource.

Upon further review, staff found additional wells with declining groundwater levels over a broad portion of the Greater Harney Valley. Decline rates ranged from less than one-foot per year to over five-feet per year.

Department staff also compared the permitted groundwater use for the Greater Harney Valley area to the groundwater budget (the balance for what goes into the system through recharge and what is withdrawn or discharged from the system) for the Harney Basin. This comparison helps the Department to assess whether additional groundwater supplies are available for new uses. Not all groundwater is available for consumptive uses. Under natural conditions, aquifer recharge is balanced by aquifer discharge that supports stream baseflow, spring discharge, and evapotranspiration for groundwater-supported ecosystems. Consumptive uses are an added component to the groundwater budget.

Work conducted by the US Geological Survey (Robison, 1968) estimated annual aquifer recharge for the Harney Basin at approximately 260,000 acre-feet. Department staff estimated the minimum annual groundwater discharge needed to support streams and springs is 89,200 acre-feet, leaving 170,800 acre-feet of discharge available for use.

The Department estimates 95,833 acres of primary and supplemental groundwater rights have been issued in the Harney Basin. At a duty of three acre-feet of water per acre, the permitted annual volume of groundwater is estimated to be 287,500 acre-feet. Based on an analysis of satellite imagery, it is estimated that approximately 30 percent of the permitted groundwater irrigation acres have not been developed. The current annual use for groundwater rights is

estimated at 201,250 acre-feet, which exceeds the 170,800 acre-feet available for use and accounts for 77 percent of the entire groundwater budget for the Harney Basin. Consequently, groundwater levels are declining as total discharge exceeds recharge, depleting the water that is being stored in the aquifer.

Based on the broad area of groundwater level declines, and the comparison between the Harney Basin groundwater budget and the permitted amount of groundwater, there is no groundwater available for new uses in this aquifer system. This finding has no impact on exempt groundwater uses; however, the Department cannot issue new permits at this time.

In response, the Department has reached out to the local community to build awareness of the situation, seek their input, and initiate collaborative efforts to address the long-term water needs for the area. In addition, the Department has started a basin groundwater study for the Greater Harney Valley area, which is expected to take 4-5 years to complete and will provide additional insight into the aquifer system and whether there is additional opportunity for new development.

In the meantime, the Department is working on updating the Division 512 rules for the Malheur Lake Administrative Basin. A rules advisory committee is being formed. The changes will recommend classification of groundwater in the Greater Harney Valley area for exempt uses only, and propose a mitigation approach that will provide some flexibility with the currently allocated groundwater permits. The Department intends to bring the proposed rules to the Commission for adoption in November 2015.

IV. Conclusion

In response to groundwater level declines in the Greater Harney Valley, the Department will be conducting a rulemaking to ensure responsible management of the resource while conducting additional research.

The water supply challenges in the Greater Harney Valley area underscores the need to better understand our water resources, identify current and future needs, and identify options to meet these needs as called for in the 2012 Integrated Water Resources Strategy. It also highlights the need to help communities understand and meet their water resources challenges. As a result, the Department will also try to engage the Greater Harney Valley area in place-based planning to help the area evaluate its water resources options.

V. Attachments

- Attachment 1. Greater Harney Valley Area
- Attachment 2. Harney Basin Area
- Attachment 3. Harney Basin and Greater Harney Valley Area

VI. References

Piper, A.M., Robison, T.W., and Park C.F. 1939. Geology and Ground Water Resources of the Harney Basin, Oregon. USGS Water Supply Paper 841.

Robison, J.H. 1968. Estimated Existing and Potential Ground-Water Storage in Major Drainage Basins in Oregon. USGS Open File Report 68-232.

Waring, G.A. 1909. Geology and Water resources of the Harney Basin Region, Oregon. USGS Water Supply Paper 231.

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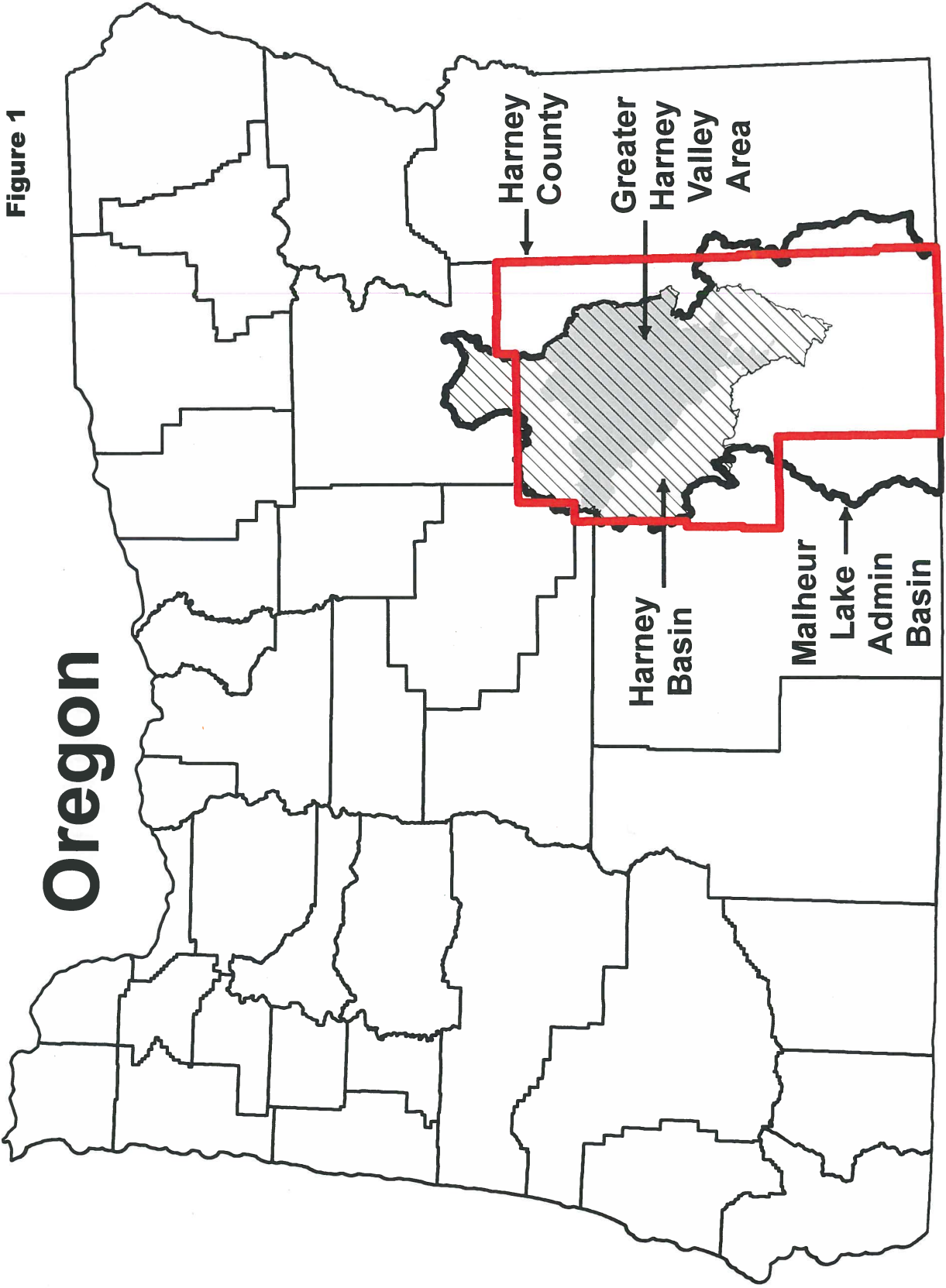
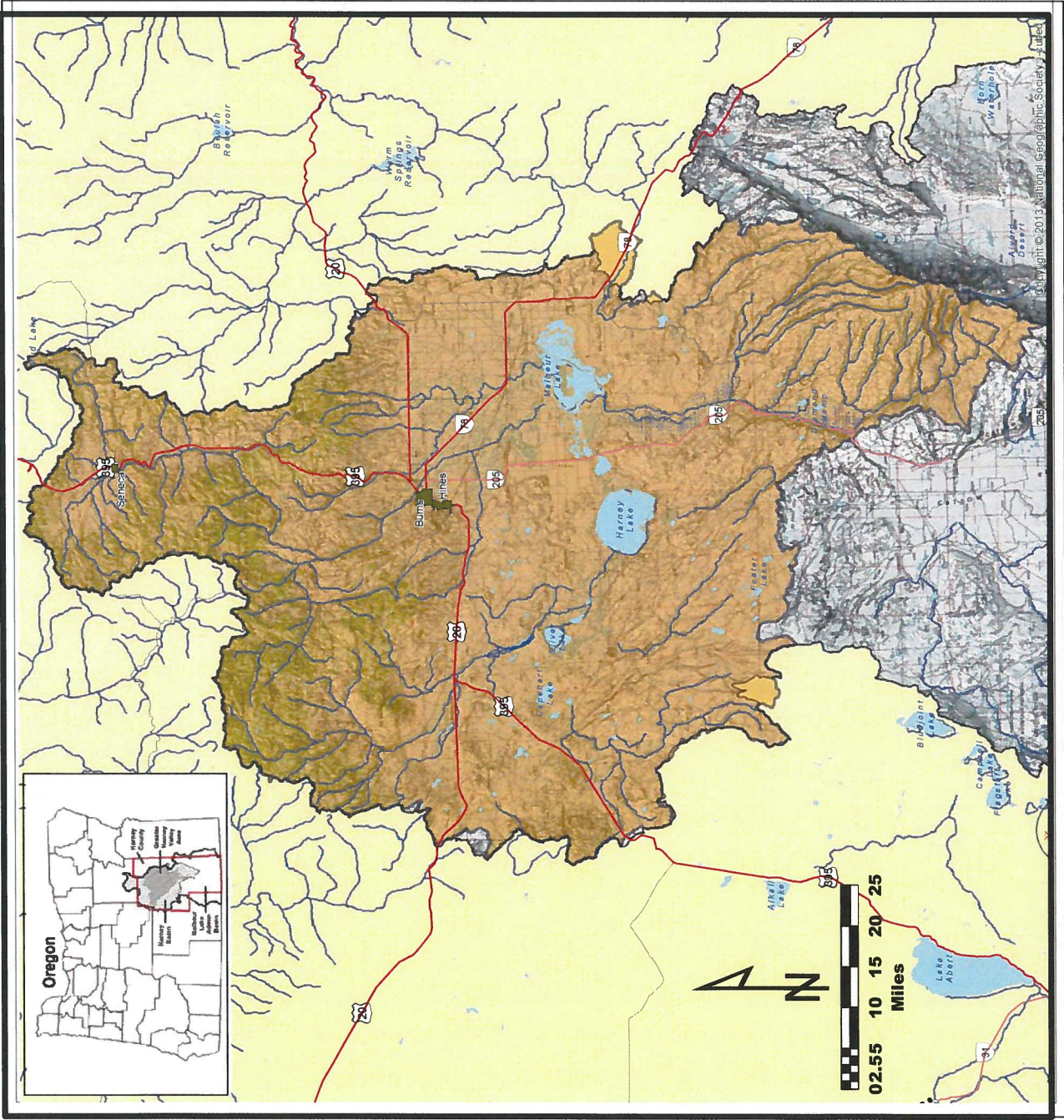


Figure 1

Figure 2



Harney Basin

Entire Harney Basin Area

Oregon Water Resources Department
June 2015

Explanation

Harney_Basin

Software: ESRI ArcMap ver. 10.1
Source File: S:\groups\water\ground\areas\harney_valley\arcview\ Harney_Valley_POU_GW_Recharge_2014_Analysis.mxd

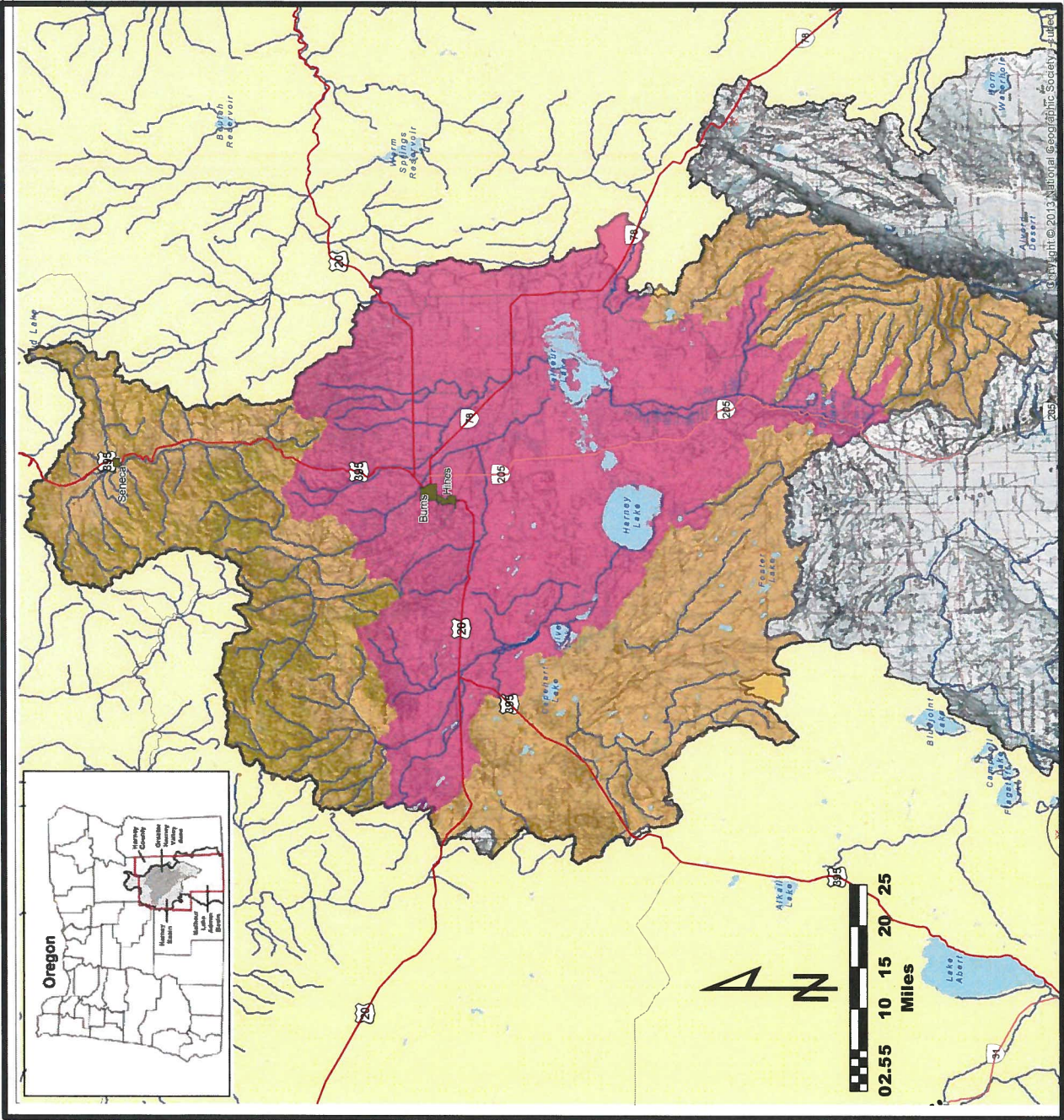
Oregon Lambert Projection, NAD 83 (EPSG# 2992)

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Figure 3



Harney Basin and Greater Harney Valley Area

Oregon Water Resources Department
June 2015

Explanation

- Harney Valley & Adjoining Valleys & Bounding Uplands
- Harney_Basin

Software: ESRI ArcMap ver. 10.1
 Source File: S:\groups\water\ground\areas\harney_valley\arcview\harney_valley_POU_GW_Recharge_2014_Analysis.mxd
 Oregon Lambert Projection, NAD 83 (EPSG# 2992)

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