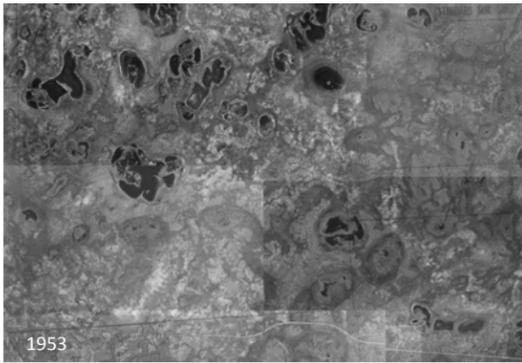


# Hydropattern Study of the DR/GR



**ABSTRACT:** Kevin L. Erwin Consulting Ecologist, Inc. (KLECE) conducted an extensive land use cover study of nearly 83,000 acres located in southeast Lee County designated as a future land use categories of Density Reduction / Groundwater Resource Protection (DR/GR) and Wetlands. Ecological interpretation of 1953 and 2007 aerial photographs was converted to GIS layers to differentiate the historic and current hydropatterns. Prior to this study, it was not known what degree of change in hydropatterns had occurred in this portion of the county. The study identifies a conservative estimate of over 28,000 acres or 40% reduction in wetland between 1953 and 2007. Currently, approximately 72,962.6 acres or 88% of the DR/GR remain natural or in some form of agricultural use. The results of the mapping have been utilized in identifying priority restoration areas in southeast Lee County as part of a comprehensive land use study and plan done in conjunction with Dover, Kohl & Partners for the Lee County Board of County Commissioners.



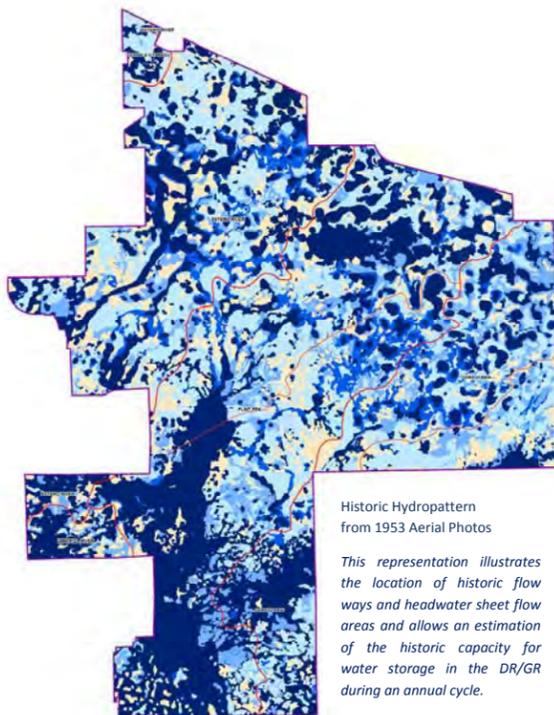
**Purpose:** The hydropattern study was necessary in order to reasonably characterize the historic and existing conditions of the DR/GR landscape. Up to this point the extent of wetlands conditions prior to alteration or the extent of wetland losses and changes in hydropatterns was not known. The study provides a better understanding of the present day condition of the DR/GR, identifies future opportunities for managing the natural resources in the DR/GR, and proposes a water management restoration concept that protects wetlands and agricultural lands while restoring the water storage capabilities of this vital part of Lee County.

**Methods:** 1953 aerial photographs from the National Resource Conservation Service were scanned and plotted for mapping by experienced ecologists to determine the approximate historic hydrological conditions for the entire study area. The major habitat associations identified relate to specific hydroperiod and water depth conditions (hydropatterns), with each being color-coded to illustrate the historical hydropatterns in the DR/GR. The estimated depths of inundation and hydroperiods are typical ranges of conditions for unaltered wetland systems in southwest Florida. The coding system of the 1953 conditions was developed by KLECE for this project to capture the most critical data from the 1953 aerials in a format that can align with later analytical efforts within the DR/GR.

Results:	Historic Wetland Coverage - 1953		Current Wetland Coverage - 2007		Wetland Loss	
	Habitat Type	Acreage	FLUCFCS Code	Acreage	Percentage	Acreage
	Deep, Long Hydroperiod Wetlands	30,712.6	621, 641	14,607.7		16,104.9
	Shallow, Long Hydroperiod Wetlands	5,545.5	610, 617, 619	373.4		5,172.1
	Shallow, Shorter Hydroperiod Wetlands	10,598.3	262, 624, 628, 630, 631, 643, 624, 628	16,260.0		5,661.7
	Very Shallow, Short Hydroperiod Wetlands	24,112.9	625	11,300.4		12,812.5
	<b>Total</b>	<b>70,969.3</b>		<b>42,541.5</b>	<b>40%</b>	<b>28,427.8</b>

KLECE estimates that drainage within the study area has resulted in significant lowering of the water table during both wet and dry seasons and a shortening of wetland hydroperiods. Comparison of the two mapping products shows that 40% of the DR/GR's wetlands have been lost over the past 50 years. A comparison of hydropatterns shows the degree of wetland habitat fragmentation, which is most pronounced north of the east-west Lee-Collier County line. Approximately 60% of the deepest wetlands with the most extended hydroperiods (ponds, freshwater marshes, deep and shallow cypress) have been lost, with the hydrology of an unknown percentage of the remaining wetlands impacted by drainage.

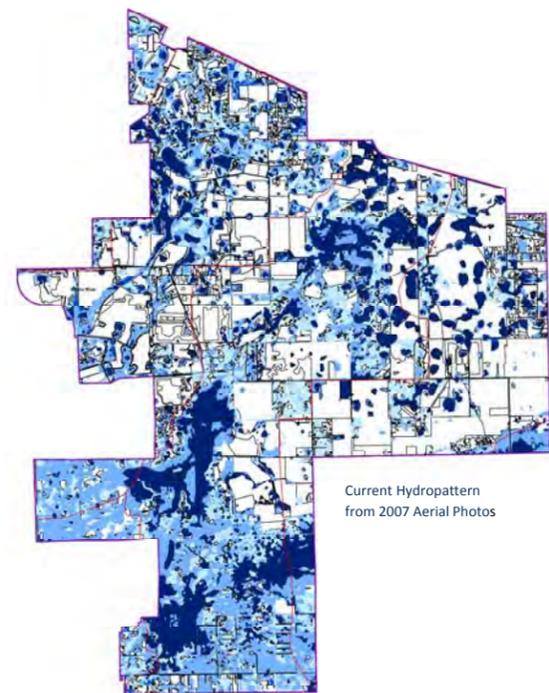
The DR/GR is clearly drier today with fewer wetlands on the landscape and shorter hydroperiods. The implementation of a surface and shallow groundwater monitoring system would provide data needed to assess the existing hydropattern conditions in the study area. This lack of water represents additional potential water storage capacity that exists within the DR/GR if appropriate management and restoration techniques are implemented.



Summary of the Hydropatterns in the DR/GR

Wet Season Water Depth	Wetland Hydroperiod	Map Index Color
1.5 - 2.5'	7-9 mos	dark blue
0.75 - 1.5'	4-7 mos	blue
0.25 - 0.75'	1-3 mos	medium blue
-0.5 - 0.25'	1-2 mos	light blue

The deeper ponds, cypress swamps, and marshes have been assigned dark blue with progressively shallower, shorter hydroperiod (shorter duration of inundation) wetlands being assigned lighter shades of blue.



**CONCLUSION:** A combination of wetland management, sustainable agriculture, and phased wetland restoration is possible and necessary within the DR/GR to protect and enhance the water resources within the DR/GR which provide drinking water to the majority of residents within unincorporated Lee County; provide irrigation water for field crops and citrus groves, and are necessary to sustain natural wetlands and surface waters including the Estero River.

**Future Activities and Information Gaps:** There is a significant need for collecting and evaluating new information to be used for planning and management purposes. The lack of hydrological data is the most significant information gap requiring immediate attention in the DR/GR and heads the following list of recommended future Lee County activities and data collection.

1. Prepare a hydrological model of the study area which includes estimated watershed boundaries.
2. Implement a comprehensive long-term surface and groundwater monitoring network that includes shallow wells, deep wells, staff, flow and rain gauges.
3. Develop and refine water budgets for each watershed in the DR/GR and conduct a comparative analysis with the estimated historical conditions.
4. Develop detailed restoration plans for each watershed.
5. Initiate discussions with agricultural interests on sustainable agriculture, habitat management and restoration objectives.
6. Conduct limited ground-truthing to improve the accuracy of the existing conditions desktop mapping.
7. Obtain accurate topography for the study area.
8. Maintain and improve existing policy regulations requiring site and project specific hydrological data collection and analysis, including surface and groundwater monitoring, water budget, and water quality monitoring.
9. Develop a working agreement between Lee and Collier County governments on land and water resource management on lands within watersheds shared by these counties.

