RAS FF-7

Hearing Docket

From: Emily Casey [ecasey21@hotmail.com]
Sent: Thursday, June 11, 2009 9:39 AM
To: Docket, Hearing; Wright, Megan; Julian, Emile; evageline.ngbea@nrc.gov
Subject: resubmitting limited apperance documents
Attachments: title of book.doc; page 5a.doc; page 5b.doc; page 11.doc; page 42a.doc; page 42b.doc; page 43a map.doc; page 43b map bottom.doc

NOTES:
I had to take 1 page and scan it into two parts - they are titled with the page number and then (a) or (b).
The hydro-geology of this area is very important and when it comes to the computer model used for predication of the disbursement of radiological effluent released particles in the air or water it can not be used to model for aquifer water!!

The map - page 43a and 43b - shows the area of concern in Levy County as still under study. Please note this reference map was printed in 1985, now the Levy County Aquifer Vulnerability Assessment Report has been completed (it is enclosed in the packet submitted earlier). It shows some reasons why this area is highly vulnerable. It does not address the increased water consumption already in the area and thus the decrease in the amount of water now available for use. The problem of salt water intrusion into what use to be fresh water has already occurred in that area to commercial entities and private wells alike.
Thank You for allowing me to resend the copies.

Sincerely,
Emily Casey

DOCKETED
USNRC

June 11, 2009 (9:39 a.m.)
OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF
DOCKET NO. 52-029 and 52-030-COL

Template = SECY-038

DS-03

Received: from mail1.nrc.gov (148.184.176.41) by TWMS01.nrc.gov
(148.184.200.145) with Microsoft SMTP Server id 8.1.358.0; Thu, 11 Jun 2009
09:39:29 -0400
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X-SBRS: 4.4
X-MID: 2967881
X-IronPort-AV: E=Sophos;i="4.42,202,1243828800";
d="doc'32?scan'32,32,217,208";a="2967881"
Received: from col0-omc1-s16.col0.hotmail.com ([65.55.34.26]) by
mail1.nrc.gov with ESMTP; 11 Jun 2009 09:39:17 -0400
Received: from COL106-W39 ([65.55.34.8]) by col0-omc1-s16.col0.hotmail.com
with Microsoft SMTPSVC(6.0.3790.3959); Thu, 11 Jun 2009 06:39:16 -0700
Message-ID: <COL106-W3939E19ABE5BBA5B0E19ACC4420@phx.gbl>
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Content-Type: multipart/mixed;
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Subject: resubmitting limited apperance documents
Date: Thu, 11 Jun 2009 09:39:14 -0400
Importance: Normal
MIME-Version: 1.0
X-OriginalArrivalTime: 11 Jun 2009 13:39:16.0990 (UTC) FILETIME=[040269E0:01C9EA9A]

GROUND-WATER RESOURCE AVAILABILITY INVENTORY: CITRUS COUNTY, FLORIDA

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
AUGUST 1987

II. GROUND-WATER BASIN OVERVIEW

INTRODUCTION

A ground-water basin is a three-dimensional closed hydrologic unit that contains the entire flow paths followed by all water recharg[illegible] the basin (Freeze and Witherspoon, 1966). The bottom boundar[illegible] usually an impermeable basement rock and the top boundary surface. The lateral boundaries are imaginary vertical imper[illegible] ground-water divides. These ground-water divides are gener[illegible] delineated by high and low ridges in the potentiometric sur[illegible] the aquifer. Although not as well defined as the more pronounced ground-water basins of western United States, ground-water resources in Florida can be divided into several distinct ground-water basins. Figure 1 is a modified version of Fisk's (1983) delineation of the ground-water basins in Florida. Two ground-water basins occur in west-central Florida and include nearly the entirety of the SWFWMD. For the purpose of this report these two basins are termed the Northern West-Central Florida Ground-Water Basin and the Southern West-Central Florida Ground-Water Basin (SWCFGWB).

The NWCFGWB is bounded on the east by the axis of the Green Swamp and Keystone Floridan aquifer system potentiometric highs, the most pronounced ground-water divide in peninsular Florida (Figures 1 and 2). On the north, the Basin is bounded by the axis of the Keystone and Bronson potentiometric highs, and on the south by the Pasco and Green Swamp highs. On the west the Basin is bounded by the Gulf of Mexico. The SWCFGWB is bounded on the east by the axis of the Green Swamp high, to the north by the Pasco and Green Swamp highs, and on the south and west by the Gulf of Mexico. Although ground-water basin boundaries may change due to climatic conditions or ground-water withdrawals, presently ground water north of the Pasco-Green Swamp ground-water divide flows north and west to the Gulf of Mexico and water to the south flows south and west to either the Gulf of Mexico or the Tampa Bay-Ruskin potentiometric low.

HYDROLOGIC AND PHYSICAL DESCRIPTION OF THE BASIN

GEOGRAPHIC SETTING, TOPOGRAPHY, AND DRAINAGE

The NWCFGWB is approximately 4,500 square miles in extent and includes all of Hernando, Citrus, and Sumter counties, and major areas of Alachua, Levy, Marion, Lake, Polk, Putnam, and Pasco counties (Figure 3). The Basin is characterized by relatively flat, generally swampy lowlands in the coastal areas butting against the north-northwesterly trending Brooksville Ridge. Land surface altitudes range from sea level at the coast to greater than 250 feet above the National Geodetic Vertical Datum (NGVD) at several places along the Brooksville Ridge (Figure 4). The rolling hill and valley terrain along the ridge results in irregular topography. The 100-foot contour generally outlines the northwest trending Brooksville Ridge (Fretwell 1985). East of the ridge, the altitude ranges from 50 to 100 feet above NGVD and the topography is relatively subdued. Figures 5a, 5b, and 5c are east-west and north-south trending cross-sections that illustrate the topography in the Basin.

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The Basin is characterized by karst terrain, developed through the dissolution of the underlying limestone and dolomite resulting numerous swamps, lakes, and shallow sinkholes. Surface drainage absent or poorly developed in most of the Basin, but waters from coastal springs, and the Withlacoochee and Little Withlacoochee Rivers flow through well-defined stream channels.

The dominant river basin is the Withlacoochee flowing 120 miles from the Green Swamp to the Gulf of Mexico at Yankeetown, Florida. extent of this basin is over 1980 square-miles and lies Tsala Apopka Plain and Webster Limestone Plain described (1981), (Figure 6). Located between the Brooksville ... Florida Ridges, the Withlacoochee River drains through the gap in the Brooksville ridge (Figure 6). The sandy soils are thin to absent along the river and there are many areas of recharge into and discharge directly from the Floridan aquifer system's shallow limestones. Three major wetland areas are the Green Swamp, Tsala Apopka Chain of Lakes, and Coastal Marsh. Recent studies indicate that the Green Swamp is an area of low recharge (0-2 inches/yr), due to the aquifer system being nearly saturated, resulting in mostly rejected recharge (Grubb and Rutledge, 1979; Ryder, 1985; and Adams 1985). The coastal lowlands have essentially no recharge, and the Tsala Apopka area has a small net recharge. The wetlands are very important biologically for water purification and, therefore need be considered as conservation areas.

There are 6 first magnitude springs and numerous second and third magnitude springs in the Basin. Many of the first magnitude springs are headwaters for coastal rivers. Virtually all springflow derived from the Floridan aquifer system.

The geology, topography, and drainage are all interdependent with water erosion shaping the limestone chemically and mechanically. The karst nature of the limestone results in solution features redirecting runoff underground. The sand and soft limestone supporting the flat to hilly topography was first shaped by beach erosion terracing the sand and stone. Afterwards, weak limestone caverns collapsed and surface erosion reshaped the highland sands. Nutrients and fresh water entering the Gulf also supports a large estuary system along the coast.

CLIMATE - this section explains rainfall mostly for Inverness so I did not include Fig 7

The climate of the NWCFGWB is characterized by long, warm, humid summers and short, mild winters. Average monthly temperatures range from 60° F in January to 82° F in July and August (National Oceanic and Atmospheric Administration (NOAA), 1983). Average annual temperature is 72° F.

Some rainfall normally occurs during each month, but a rainfall season extends from June through September rainfall season extends from October through May. rainfall is relatively light because west-central Florida of the normal southern limit of winter frontal systems. The average annual rainfall in the Basin is 55 inches per year. About sixty percent of the annual rainfall occurs during the rainy season and is derived principally from convectional storms. The Inverness Weather Bureau Station is centrally located in the NWCFGWB and Figure 7 addressed when the models are completed, however, areas suitable for development, based on existing information are discussed below.

General areas suitable for future water resource development within the NWCFGWB, based on existing data are delineated in Figure 23. Areas suitable for future development have been delineated in Hernando, Marion, and Sumter counties by consultants completing Master Water Use Plans for the counties. Additionally, the United States Geological Survey (USGS) has delineated the location of the 250 mg/l chloride isochlor in the Upper Floridan aquifer which greatly lessens the suitability for water resource development coastward of this isochlor. Areas of suitability in Citrus, Pasco, Polk, Levy, and Lake counties have yet to be established. However, as of January, 1987, Citrus County was nearing completion of delineating suitable areas.

Common to the areas found suitable for water resource development in Figure 23 is that these areas have sufficient water quality to meet public health standards (FAC, 17-22,) and sufficient quantity to minimize impacts to the environment and hydrology from withdrawal. Russell and Axon, Inc. (1985) used a ranking system primarily based on DRASTIC maps to evaluate the existing water quality and quantity, as well as the potential water quality and quantity in the areas studied. As illustrated in this figure, ground-water quality, or the potential for ground-water contamination, may be the limiting factor for ground-water development, in the near-term, and not water availability. Figure 23 is a compilation of existing data on suitability and will be updated at a later date to fill in those areas not delineated and adjust those areas that require refinement or reevaluation.

The SWFWMD is responsible for regulating the consumptive use of water and requires a consumptive use permit (CUP) for all ground-water withdrawals that exceed 100,000 gallons per day (gal/d) on an average-annual basis or have the potential of producing 1,000,000 gal/d, or are from wells with pipe casing diameters of 6 inches or greater. CUP applications must show reasonable and beneficial use of the water being withdrawn and that there is no interference with existing legal uses of water. The SWFWMD evaluates CUP applications based on similar criteria as listed above in an effort to balance the needs of water users with the needs of the environment.

Environmental and potential contamination concerns are presently being given more consideration for determining suitability of future development. In particular, proximity of heavily developed areas, industrial sites, mining sites, landfills, and surface-water bodies hydraulically connected to ground-water systems are factors which should affect site selection of future wellfields. Land use around wellfield areas must be evaluated carefully, since large ground-water withdrawals induce greater recharge rates, which in turn increases migration of contaminants through the ground-water system.

While the SWFWMD ultimately permits water resource development through its permitting process, proper planning of water resource development is achieved through a cooperative effort among SWFWMD, water supply authorities, and county governments. The large amount of information contained within SWFWMD's CUP files and Data Collection files, the completion of regional ground-water flow

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(LCFAVA - study shows levy area vulnerable

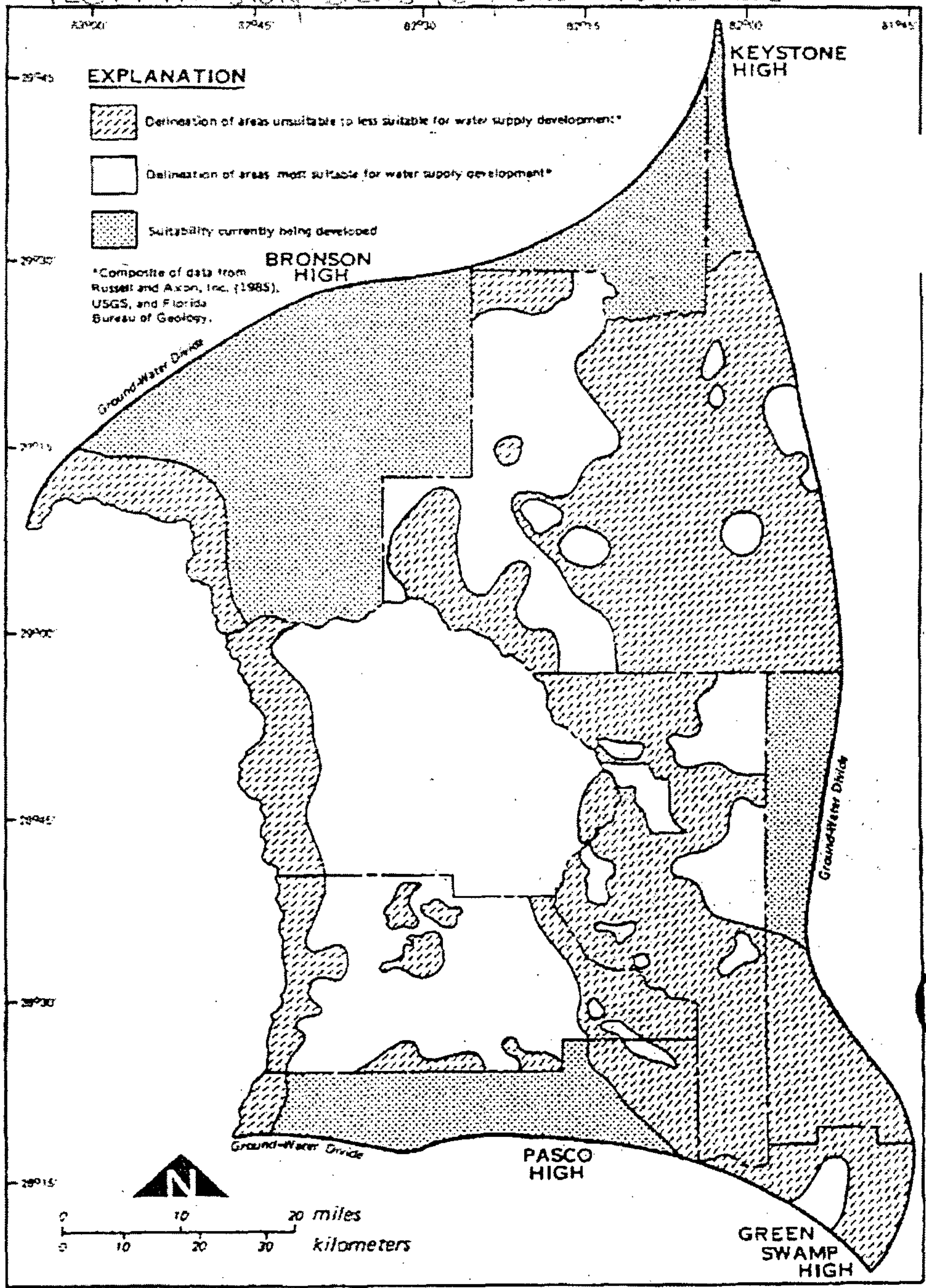
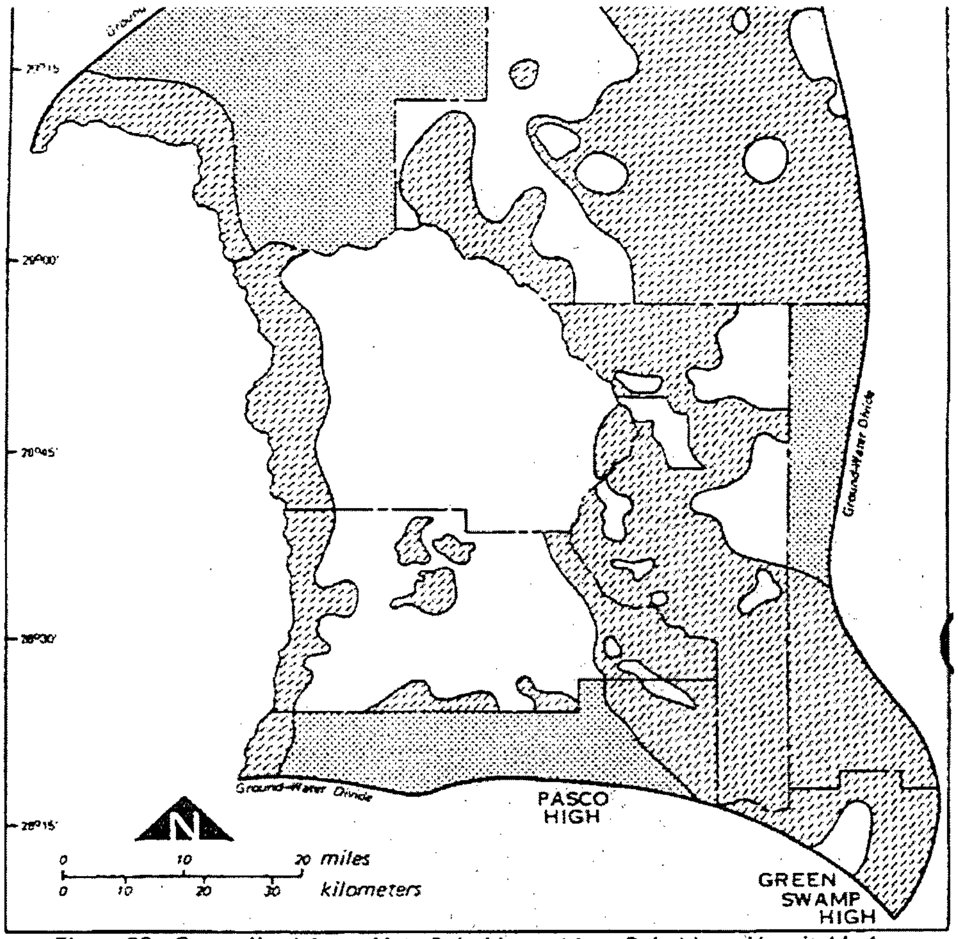


Figure 23. Generalized Areas Most Suitable, and Less Suitable to Unsuitable for Ground-Water Supply in the Northern West-Central Florida Ground-Water Basin (modified from Russell and Axon, Inc., 1985).



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