

CHOLDERTON & DISTRICT WATER COMPANY LIMITED

DROUGHT PLAN 2007

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CONTENTS

<u>Headings</u>	<u>Paragraphs</u>	<u>Pages</u>
Preface	1 – 4	1
Introduction	5 – 7	1
River Bourne	8 – 9	1
Pressure on Water Supplies		
Early Indicators	10 – 13	2
Slow Recharge at Thruxton	14 – 16	2
Drought Conditions	17 – 18	2
Drought Action Plan	19 – 25	3, 4
Implementation Timescales	26	4
Management and Communications		
Strategy	27 – 29	4, 5
Severe Drought Measures	30 – 35	5, 6
Consultation with External		
Agencies and Companies	36 – 38	6
Environmental Assessments	39 – 42	6, 7
Drought Orders and Permits	43 – 45	7
Post Drought Operations	46 – 48	7
Learning the Lessons	49	8

APPENDICES

Appendix A		
Nitrate Pollution		A - 1
Appendix B		
Operational Definitions of Drought		B - 1
Sequence of Drought Impacts		B – 1, 2
Appendix C		
References		C - 1
Acknowledgements		C - 1

Preface

1. The company has a duty to provide a safe, reliable and regular supply of water to its customers. The Water Act 2003 made it mandatory for water companies to produce a Drought Plan in accordance with the new section 39B of the Water Act 1991.
2. In normal circumstances the water resources available to the Cholderton & District Water Company through its abstraction licence are sufficient to meet the demand for water in its area of supply. Similarly, the company's customers have been supplied without inconvenience or interruption in periods of drought, as demonstrated most recently in the early to mid 1990s.
3. The full impact of climate change is fraught with uncertainties but a briefing from the Hadley Centre of the Meteorological Office contained a forecast that average temperatures in the South West will rise, with drier summers and wetter winters. Overall rainfall is likely to decrease but there is a likelihood of more intense precipitation events leading to an increase in the frequency and severity of floods and droughts. There will be increased pressure on water resources because of higher demand for water from households, agriculture and industry.
4. This plan is concerned with the arrangements that the company has in place to maintain supplies of water to customers in the most severe conditions of drought.

Introduction

5. The company has a supply area of 21 Km² which forms a single Resource Zone. For the purposes of this plan the Resource Zone and the Drought Management Area cover the same area. The main feature which runs through the company's area is the North/South valley of the river Bourne.
6. Water is abstracted from 2 boreholes approximately 2Km apart and pumped into 2 service reservoirs, designated high and low levels, with capacities of 1,135m³ and 453m³ respectively. Water is delivered by gravity through a 48Km network of mains pipes.
7. There are currently a total of 724 connections of which 24 are business or commercial properties. An estimated population of 2,100 receive their water supplies from Cholderton. The two main centres of population are the villages of Shipton Bellinger and Cholderton which together account for 80% of the connected customers. Both villages sit astride the river Bourne.

River Bourne

8. The river Bourne is a winter bourne, only flowing down its entire length after ground water recharge has been completed. This has nearly always occurred in the early part of the year. The only recent exceptions have been when the late summer and autumn rains were so heavy and continuous that recharge and hence flow occurred in the early winter before Christmas.
9. In recent decades it has been normal for the river not to flow down its entire length although the springs higher up the valley nearly always run. Initial flow is uneven; the flow creeps upstream from Porton and Idmiston where it is normally permanent, as ground water level rises. Concurrently the springs near Collingbourne Ducis rise and fill the river above Tidworth. This flow, though it may fill the river to the brim, will peter out in a few metres as the water rapidly soaks away into the dry stream bed below. Gradually the river gains ground and eventually flows through Tidworth and Shipton Bellinger meeting the flow that has been working upstream through Allington and Newton Toney, at Cholderton. When this happens continuous flow is achieved down the whole length of the river.

Pressure on Water Supplies - Early Indicators

10. Following a period of low or minimal rainfall there are 2 indicators which demonstrate that water supplies may come under threat. Individually they do not necessarily represent a precursor to action by the company but, taken together, they give prior warning of pressure on the availability of water resources.

11. Failure of the springs to rise at Collingbourne Ducis in the autumn indicates low ground water levels and lack of recharge. This serves as an early warning that low winter rainfall may affect the ability of the Thruxton borehole in particular to achieve its normal post winter levels.

12. The company receives a copy of the Wessex Area Hydrometric Report that is produced monthly by the Environment Agency. This report gives details of the groundwater levels at Tilshead with an accompanying analysis of trends. Because they are in the same geological unit there is a relationship between the water levels at Tilshead and Cholderton. Adverse trends in the former are likely to be replicated at the latter. This report is ideal as an early warning indicator.

13. A combination of the two events outlined in paragraphs 11 and 12 during a period predicted low rainfall would trigger the initial action by the company. All customers would be made aware of the need to exercise restraint in their use of water.

Slow Recharge at Thruxton

14. The well at Thruxton Hill is some 85 metres deep and normally has a rest level of 57 metres. This level is not an indicator of water paucity, but the rate of recharge is. Slow recharge of the well causes longer pumping hours and the water tends to be momentarily milky in appearance because of the absorbed air.

15. At this point the Company will cease abstractions there and move production to the standby source at Compton Corner. This has been done during the summer months on several occasions. There has been no need to utilise the borehole at Compton Corner at all during 2007.

16. Assuming that both the early indicators are active, the switching to the Compton Corner borehole for supplies to fill both the service reservoirs would initiate the second trigger in the company's action plan.

Drought Conditions

17. The Compton Corner borehole was sunk in 1978 and has an effective working depth in excess of 122 metres. It passes through several layers of rich water bearing strata giving it a very effective recharge rate even when extensive pumping takes place. It is virtually inconceivable that the water supply will fail in circumstances other than one brought about by a mechanical failure. There was no significant pressure on water supply during the 8 months of drought in 1995-6 when the borehole was used to fill both service reservoirs.

18. However, should the conditions exist where it appears that the company will remain exclusively reliant on the Compton Corner borehole for a period when in normal conditions the Thruxton borehole would be in use, the company will approach the Environment Agency's team in Blandford to seek more detailed information about the current and predicted levels at their Tilshead borehole. If it appears that the conditions exist for an impending hydrological drought and the company's exhortations to customers to conserve water have failed, the company's third trigger will be initiated.

Drought Action Plan

19. The company has identified scenarios whereby 3 separate triggers will be initiated as the severity of drought conditions increases. Details for each can be summarised as follows:

- Trigger #1 – paragraphs 12 & 13; Bourne failing to rise coupled with adverse groundwater trends at Tilshead
- Trigger #2 - paragraphs 15 & 16; switch from the Thruxton to Compton Corner borehole with no change in adverse groundwater trend at Tilshead
- Trigger #3 - paragraph 18; exclusive reliance on Compton corner coupled with an impending hydrological drought and no reduction in consumer demand.

20. The plan is divided into 4 phases. Phases 1 – 3 follow on from the activation of the triggers described in paragraph 19 and cover the procedures that the company will adopt to maintain supplies and the procedures it will use to communicate with its customers, the regulatory authorities and other relevant parties. Phase 4 describes the exceptional measures that may have to be adopted should extreme drought conditions threaten the ability of the company to provide water supplies to customers from its own resources.

21. The initiation of Phase 1 will mean that the company will make all customers aware of the need to conserve water:

- Notices will be posted in:
 - The village shop at Shipton Bellinger
 - Public houses in both villages
 - Hillside garage
- Letters will be sent to:
 - All commercial premises
 - The 20 metered premises consuming the most water
 - Chairmen of the 3 parish councils

22. From the outset of Phase 1 the company will take steps to ensure that avoidable water losses through leakage are minimised. A programme of leak detection using the 15 minute web-based data-logging system has proved successful. This system will be used as the basis for a daily management review of minimum night time usage throughout the network. An investigation will follow if any unusual demand is detected.

23. Cholderton Estate, the largest individual water user, will instigate a programme whereby relevant employees are made aware of the need to conserve water and all cattle troughs and stop taps are checked regularly for leaks. Work orders for the repair of leaks will be strictly prioritised and actioned.

24. The implementation of Phase 2 will involve the company in posting further notices in the premises listed in paragraph 21. Every customer will receive a leaflet with their water bill explaining the seriousness of the position with practical suggestions as to how they could save water and play a part in alleviating the situation. Personal visits will be made to all commercial premises and the larger metered users. In addition:

- A broadcast will be made on Spire FM, the local radio station:
 - Asking customers to conserve water and telling them what positive actions they can take.
 - Telling anyone who has a water leak or needs advice on water conservation how to contact the company.
- A meeting will be arranged with parish chairmen to advise them of likely future measures should the drought intensify or consumers fail to respond to the appeal to conserve water.

- The company's current procedure of measuring borehole levels and abstraction rates monthly will be changed to weekly readings. These will indicate whether demand for water is increasing or decreasing and if the borehole is recharging satisfactorily.

25. If conditions continue to deteriorate and it appears that Phase 3 may have to be implemented, the company will:

- Post notices as paragraph 21 additionally notifying them of the intention to:
 - Impose a hosepipe ban and also a ban on filling domestic swimming pools. A permanent ban on the use of sprinklers already exists.
- Make a further series of broadcasts on Spire FM encouraging customers to contact the company for help in conserving water.
- Make further personal visits to commercial premises notifying them that, if voluntary measures prove ineffective, the next step may be to restrict water usage.
- Approach the chairmen of the three parish councils to obtain their agreement to hold extraordinary parish meetings at which the company's representative can explain the position directly to individual consumers and answer their questions.
- Formally notify the regulatory agencies and English Nature of the seriousness of the situation and seek their advice in the event that the implementation of further measures is necessary.
- Increase the frequency of borehole level monitoring and abstraction rates if the phase 3 conditions continue for a prolonged period without any signs of alleviation.

If the conditions described in paragraph 18 occur despite the above measures being taken trigger #3 will be initiated and Phase 3 will be implemented.

Implementation Timescales

26. The implementation of Phase 1 which, from the consumer viewpoint, is primarily an awareness campaign should take no more than 2 to 3 days from the time that the conditions occur to initiate trigger #1. Although the company's internal measures can be put in place within 72 hours, Phase 2 will take longer to implement because of the time needed to arrange appointments and book radio time. Even so, with intelligent anticipation, no more than 2 weeks will be needed to complete the consumer-related measures. Phase 3 implementation will take 3 weeks in order to allow sufficient time to arrange the parish meetings.

Management and Communications Strategy

27. In the event of the company declaring that it will initiate Phase 2 and implement the measures set out in paragraph 24 the managing director will activate the Drought Action Team comprising the following personnel who will assume specific roles and responsibilities:

Name	Title	Drought Role
Mr H Edmunds	Managing Director	Drought Manager
Miss B Edmunds	Director	Communications Manager
Miss V Brett	Company Secretary	Customer Liaison
Mr A Fry	Resources Engineer	Regulatory Authorities Liaison
Mr B Young	Water Engineer	Leakage & Level Monitoring

The Managing Director will take on 3 specific responsibilities:

- Ensuring that the measures required of the Cholderton Estate are implemented and enforced.
- Liaison with English Nature to assess the potential impact of drought measures including an assessment of the risk to water dependent sites affected indirectly by Cholderton's water abstraction.
- Liaison with Wessex Water should a scenario involving emergency water supplies develop. See paragraphs 31 & 34.

28. The way in which the company plans to communicate with its customers as the drought plan unfolds up to Phase 3 is set out in paragraphs 21 – 25. If such severe drought conditions occur that even the Compton Corner borehole is unable to supply sufficient water to meet demand and further measures become necessary, the company will maintain close contact with its most vulnerable customers. The two villages have a network of volunteers who will keep this group informed and notify the company of cases of severe hardship.

29. One person has been delegated to act as the liaison between the company and the regulatory authorities as the drought scenarios develop. Before Phase 3 is implemented the company's representative will liaise with the Environment Agency to make sure that the company has provided sufficient data to enable that body to initiate any plans for granting permits or approvals without undue delay.

Severe Drought Measures

30. Since it was established over a hundred years ago the company has always managed to maintain water supplies to customers in periods of drought. The most notable of these have been:

- 1933 - 1934, a two season intense drought
- 1975 – 1976, a two season drought
- Mid 1990s, periods of drought

31. With the uncertain conditions that accompany climate change, it is prudent to plan for a scenario where drought conditions have become so severe that the water resources available to the company are insufficient to cope with demand, viz. the Compton Corner borehole will not recharge quickly enough to allow the pumps to maintain the levels in the service reservoirs high enough to provide a constant supply of water over a 24-hour period.

32. If it became apparent that the measures adopted by the company to protect water supplies at phase 3 were not having the desired effect thus putting the normal availability of water to consumers at risk of failing, the procedures for Phase 4 of the drought plan would be activated.

33. At this point the company would make application for the appropriate permits to restrict the supply of water for non-essential uses in addition to the restriction of the supply of water to commercial customers. If these measures were seen to be insufficient the company would propose to introduce a system of rota cuts across the network.

34. In the unlikely event that these measures proved ineffective in maintaining a water supply, the company has an agreement with Wessex Water for the provision of water using tankers and a supply of bottled water on pallets for distribution to domestic consumers, particularly those on the vulnerable list. This plan would also be activated if there were a mechanical or electrical failure that affected the operation of the pumping of water from the Compton Corner borehole to the service reservoirs.

35. The exact method whereby water would be made available to individual households would be worked out in consultation with Wessex Water, the representatives of local communities, district council environmental health and social services officers and the Environment Agency. The consultation is not linked to any particular phase in the plan but would commence when the appropriate government agencies, including the Meteorological Office through its forecasts, indicated that a period of prolonged or extreme drought was likely. It is anticipated that at least a month would be required to have all the measures in place for immediate activation.

Consultation with External Agencies and Companies

36. The effective implementation of any section or phase of this drought plan is dependent on the company through its designated staff maintaining close contact with the regulatory authorities, English Nature, local government and the local community. Paragraph 27 gives details of the responsibilities within the company for initiating and maintaining these contacts.

37. The Environment Agency has open access to the company's boreholes and the web-based data logging system showing water flows and usage. The advice of those officers who are allocated to Cholderton will be sought at every stage to monitor the company's mitigation efforts and to make sure that the appropriate information is provided by the company to enable the agency to process any application for a drought permit or drought order with the minimum of delay.

38. Wessex Water carry out the testing of the company's water under contract and provide a full range of analytical services. In an extended period of drought there is liable to be pressure on water quality and Wessex will be requested to increase the frequency of testing and provide the appropriate advice should adverse trends become apparent. Wessex also have a major part to play in the availability of emergency supplies of water should Phase 4 be implemented. The managing director has taken on the responsibility to maintain close contact with the relevant personnel within Wessex Water who have the authority to provide the support that is needed.

Environmental Assessments

39. The Company was involved with Wessex Water and the Environment Agency in the Bourne and Nine Mile River Project. This study has delivered a unique understanding of the behaviour of ground water movement within this catchment. It has also explored the ecology and general environmental features of the area. The Environmental Report – Final Report was completed and published by the Environmental Agency in May 2005. In its conclusions referring to the river Bourne upstream of Newton Tony, viz. Cholderton's Resource Zone and points of abstraction, the report stated; "Due to the complex hydrogeology in this part of the catchment there is limited ecological impact due to groundwater abstraction."

40. In normal conditions the company abstracts approximately 0.70×10^6 litres per day. No water is taken from the catchment and exported elsewhere. The company's leakage control programme over the past two years has reduced abstraction rates by 30% from their highest point. At the highest level there was no appreciable negative environmental impact. It remains to be seen, however, whether the potential for increased demand in a severe drought scenario will change this position.

41. The complexities in calculating the environmental impact posed by increased abstraction in an extended period of severe drought are beyond the company's resources. The senior management of the company will work with the Environment Agency and English Nature to produce an environmental assessment and monitoring programme that meets the Drought Plan Guidelines. Initial contacts will be made with these agencies during the next 6 months to establish guidelines and an outline timescale.

42. As well as being the company's largest consumer of water, the Cholderton Estate occupies 22% of the company's supply area. The estate is a fully organic agricultural enterprise. It has a well-publicised reputation for the protection of natural habitats and the promotion of biodiversity. Everything will be done to protect this position within the constraints of water availability during drought conditions.

Drought Orders and Permits

43. As can be seen in the preceding paragraphs the company will be doing all it can to:

- Promote water efficiency measures
- Publicise the need for consumers to act responsibly and limit as far as possible their use of water
- Detect any leakage very quickly and effect repairs without delay

There is no guarantee, however, that water efficiency measures will fully counteract the extra demand for water by households which is a frequent consequence of drought conditions.

44. The company's total abstraction in the year ended March 2007 was 235×10^6 litres against a licence to abstract a total of 280×10^6 litres. This gave the company a 'margin' of 16% equivalent to 27 days at maximum usage or 64 days at average usage. The close monitoring procedures described in paragraphs 22 - 25 will quickly give an indication as to whether the company is able to operate within its licence or will need to apply for a Drought Permit to increase its daily or overall level of abstraction. The company recognises that any application for a drought permit to allow increased abstraction will have to be preceded by an assessment to determine the environmental impact. Paragraph 41 sets out a timescale which covers this requirement.

45. Drought Orders may be necessary to restrict non-essential uses of water, enforce a reduction of consumption by commercial users and, as a last resort, introduce rota cuts. Full consultation with consumers, the Environment Agency and other appropriate authorities will take place well in advance of the need to implement such draconian measures.

Post Drought Operations

46. The company is determined that a return to the situation whereby all customers enjoy a reliable and regular supply of water is achieved as soon as circumstances allow. The close monitoring procedures of the Compton Corner borehole will show when water levels are stable and the recharge rate has improved. Phase 4 measures will be terminated accordingly.

47. Assuming that the immediate meteorological conditions improve and are forecast to continue, Phase 3 measures will be relaxed when:

- The recharge rate in the Compton Corner borehole allows the service reservoirs to be kept at operational levels without reducing the level of water in the borehole.
- The rate of abstraction from the borehole shows that the average daily level of water supply consistently falls within the abstraction licence.
- The Environment Agency's Wessex Area Monthly Hydrometric Report demonstrates an improving trend of groundwater levels at Tilshhead.

48. Throughout this period of improvement, pressure will be kept on consumers to keep their usage of water to a minimum. Restrictions on non essential use will remain in force until it is evident that the water in both boreholes is back to the levels expected for the time of year. Even so, it is likely that the company will wait until the following spring before lifting all restrictions.

Learning the Lessons

49. As soon as practicable after the end of restrictions, the company will enter into consultation with interested parties, including consumers, the regulatory agencies and Wessex Water to review what happened, how it was handled, where things went wrong and what improvements are necessary to make the process more efficient and effective next time. Following this review the Drought Plan will be modified to include the recommendations of the review.

APPENDIX A

NITRATE POLLUTION

The company's draft Drought Plan included a section on nitrate pollution as follows:

Nitrates in ground water pose a major threat to the future of the Company. In 1938 Cholderton Water Company had a nitrate content of 8mg per litre. Today it is bordering on 40mg/litre. In a few years our water will not meet the EU standard for nitrate. These nitrates originate from two principal sources.

The Environment Agency has calculated that 30% are derived from the Sewerage Treatment Works at Tidworth and Shipton Bellinger. I do not have recent analyses of these effluents, but when I wrote to the National Rivers Authority in 1990 I stated that Tidworth was discharging 2700 cubic metres into the dry bed of the River Bourne daily. This effluent had a nitrate content of 42mg/litre. The Shipton Bellinger works were discharging 500 cubic meters of 32.5N effluent per day into the same stream bed (19/7/90 CP/RR/SL). It is likely that these discharges have increased in recent years. Given that the Bourne Catchment is relatively small with a rapid water turnover such additions of Nitrate rich water will have a disproportionate effect. These effluents manifestly require further polishing before they are released. Reed beds should be planted below the treatment works and would reduce the Nitrate levels substantially. In Florida good results have been achieved by pumping effluent onto sand bunds. The liquid is attacked by de-nitrifying bacteria and is virtually pure before it returns to ground.

The remaining Nitrates originate from agricultural activities. These are either the residues from intensive pig farming enterprises near Collingbourne Ducis or the result of direct Nitrate application, in a readily soluble form, to arable crops.

There are solutions to this problem, but action is required.

The soils in the Bourne Valley are shallow and of marginal fertility. They are lacking in clay and are hence unable to retain nutrients which are rapidly leached into the chalk beneath. It must be a priority to identify the land where Nitrate applications are causing a deleterious effect on the public water supply and ensure that this land is entered into a Countryside Stewardship scheme by, if necessary, enforcing the new cross compliance regulations which are designed to protect ground water.

The Cholderton Estate, which covers a substantial part of the area of supply of the Company, is farmed entirely organically; but the Company is unable to influence activities occurring higher up the Valley.

The Water Company cannot accept the escalation of Nitrate pollution within this catchment. Action from DEFRA and the EA is urgently required. The window of opportunity is slipping by. I am confident that agricultural restrictions and further treatment of sewerage effluent could have a positive effect quickly. The alternative, a Nitrate removal plant, is untenable being beyond the resources of the Company.

Nitrate polluters must either desist from their activities or be prepared to meet the cost of a Nitrate removal plant under the 'polluter pays' principle.

Subsequent to the submission of the company's draft Drought Plan valuable advice on this subject has been received from the Chairman of OFWAT. A positive response has also been received from the Minister of State with responsibility for climate change with a follow up letter from within his department describing the work being undertaken with farmers and landowners to reduce pollution from nitrates.

Within the last month a working group within the Environment Agency has been established to advise the company and provide data on the causes of nitrate pollution in the aquifer from which the company extracts.

APPENDIX B

(Source: National Drought Mitigation Center)

OPERATIONAL DEFINITIONS OF DROUGHT

Operational definitions help people identify the beginning, end, and degree of severity of a drought. To determine the beginning of drought, operational definitions specify the degree of departure from the average of precipitation or some other climatic variable over some time period. This is usually done by comparing the current situation to the historical average, often based on a 30-year period of record. The threshold identified as the beginning of a drought (e.g., 75% of average precipitation over a specified time period) is usually established somewhat arbitrarily, rather than on the basis of its precise relationship to specific impacts.

The most commonly used drought definitions are based on meteorological, agricultural, hydrological and socioeconomic effects.

Meteorological drought is usually an expression of precipitation's departure from normal over some period of time. These definitions are usually region-specific, and presumably based on a thorough understanding of regional climatology. Meteorological measurements are the first indicators of drought.

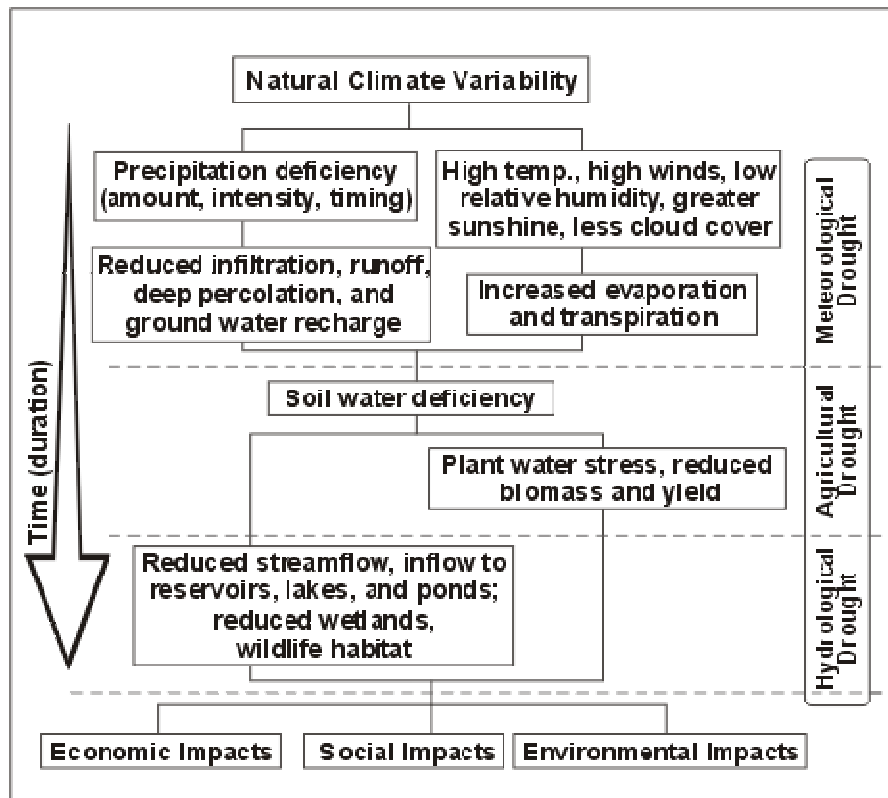
Agricultural drought occurs when there isn't enough soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought happens after meteorological drought but before hydrological drought. Agriculture is usually the first economic sector to be affected by drought.

Hydrological drought refers to deficiencies in surface and subsurface water supplies. It is measured as streamflow and as lake, reservoir, and groundwater levels. There is a time lag between lack of rain and less water in streams, rivers, lakes, and reservoirs, so hydrological measurements are not the earliest indicators of drought. When precipitation is reduced or deficient over an extended period of time, this shortage will be reflected in declining surface and subsurface water levels.

Socioeconomic drought occurs when physical water shortage starts to affect people, individually and collectively. Or, in more abstract terms, most socioeconomic definitions of drought associate it with the supply and demand of an economic good.

SEQUENCE OF DROUGHT IMPACTS

The sequence of impacts associated with meteorological, agricultural, and hydrological drought further emphasizes their differences. When drought begins, the agricultural sector is usually the first to be affected because of its heavy dependence on stored soil water. Soil water can be rapidly depleted during extended dry periods. If precipitation deficiencies continue, then people dependent on other sources of water will begin to feel the effects of the shortage. Those who rely on surface water (i.e., reservoirs and lakes) and subsurface water (i.e., ground water), for example, are usually the last to be affected. A short-term drought that persists for 3 to 6 months may have little impact on these sectors, depending on the characteristics of the hydrologic system and water use requirements.



When precipitation returns to normal and meteorological drought conditions have abated, the sequence is repeated for the recovery of surface and subsurface water supplies. Soil water reserves are replenished first, followed by streamflow, reservoirs and lakes, and ground water. Drought impacts may diminish rapidly in the agricultural sector because of its reliance on soil water, but linger for months or even years in other sectors dependent on stored surface or subsurface supplies. Ground water users, often the last to be affected by drought during its onset, may be last to experience a return to normal water levels. The length of the recovery period is a function of the intensity of the drought, its duration, and the quantity of precipitation received as the episode terminates.

(Source: National Drought Mitigation Center)

APPENDIX C

REFERENCES

1	Oct 05	Water Company Drought Plan Guideline 2005 Version 2.0	Environment Agency
2	5 Dec 05	Formal response to statutory consultation prior to producing drought plans	Environment Agency
3	Mar 06	Cholderton & District Water Company – Draft Drought Plan	CDWC
4	29 Mar 06	Response to CDWC drought plan	CCW
5	15 Sep 06	Feedback on CDWC draft drought plan	OFWAT
6	18 Sep 06	Response to statutory consultation on draft drought plan of CDWC (7 Aug 06)	Environment Agency
7	19 Sep 06	Response to CDWC draft drought plan	English Nature
8	16 Jan 07	Cholderton Statement of Response following Consultation	CDWC
9	01 Mar 07	Letter to Defra with comments on Cholderton Statement of Response	EA
10	26 Jul 07	Drought Planning – Final Directions	Defra
11	25 Jan 08	Response agreeing advise the company and provide data on the causes Nitrate pollution in Cholderton’s aquifer	Environment Agency

ACKNOWLEDGEMENTS

1. Bourne & Nine Mile Rivers
Restoring Sustainable Abstraction Project
Phase 2 Investigations
Environmental Report – Final Report
May 2005

Published by
Environment Agency
South West Region
2. National Drought Mitigation Center
University of Nebraska – Lincoln
“Understanding and Defining Drought”

Website link:
www.drought.unl.edu/whatis/what.htm