

ARIZONA GROUND-WATER REFORM:
FORCES AND CONSEQUENCES OF CHANGE IN STATE WATER POLICY

Floyd L. Marsh and Scott A. Hansen
Department of Hydrology and Water Resources and
Department of Political Science, University of Arizona 85721

INTRODUCTION

Since appearance of the Hohokam Indian irrigation canals in the Salt and Gila river valleys, Arizona has been confronted with problems of water management. In more recent times with an increased dependence on ground-water supplies, effective water management has been a principal source of political conflict in Arizona. The purpose of this paper is to identify and describe the major political forces and consequences of change involved with Arizona ground-water reform. Historical developments surrounding evolution of ground-water policy are examined to interpret these forces and consequences of change.

One of the greatest failings common to Western water law doctrines has been their inability to control ground-water overdraft (Johnson, 1980). Western ground-water law is typically, but with minor exceptions, a patchwork of legal precedent which evolved in the absence of coherent statutory code. Technical knowledge of ground-water resources was at best incomplete and unreliable during early formative states of Western ground-water law. As a result, the traditional notions of property rights in concert with the political power of entrenched users have in some areas of the Southwest impeded legislative development of effective ground-water management (Chalmers, 1974).

When Western states have addressed ground-water management they have followed relatively predictable patterns (Johnson, 1980). Changes in water law tend to occur when crises develop. Most efforts at ground-water reform are not perceived by existing users as being beneficial to them, instead they frequently view such action as an effort to extinguish or reduce their source of supply rather than to prolong it. As a consequence, such reform is reached primarily as a matter of agreement among competing water uses such as recently occurred in development of ground-water legislation in Arizona.

Arizona shares in acute form most of the ground-water management problems and historical development of legal doctrine experienced by other Western states. The main body of Arizona ground-water law has developed piecemeal through the courts and like other case law it developed as a result of conflicts among individual users over their immediate and specific needs. Prior to 1980, most of the ground-water law had been created either by judicial opinion or enacted in response to judicial decision (Goodman, 1978).

Historically, the need for ground-water control was generally recognized in Arizona, but devising a law to accomplish the purposes of management without damaging or interfering in special interests involved with a strong agricultural enterprise seemed practically impossible (Johnson, 1977). Thus, reluctance to part with the past loomed large in shaping the future of Arizona ground-water law (Goodman, 1978).

Past politics of water policy development in Arizona reveals a political style in which federal, private, and local interests have dominated, while the state's fragmented and decentralized administrative organizations have played a limited and subordinate role (Cortner, 1977). Consequently, rather than initiate policy reform, the state's principal role has been to support policy initiatives of other interests. Likewise, in the past the Legislature has been more willing to take policy action which will not alter the existing water arrangements than affirmative action, such as revision of the ground-water code, which would require change and jeopardize the political equilibrium which has been so carefully achieved and cultivated (Thomas, 1972). Convinced that a subordinate role was in the state's best interests, the state neglected to build the administrative structure in which long-term comprehensive water management and policy development could occur. As a consequence, legislative action has in the past been

generally initiated in a crisis environment.

Water politics in Arizona can be characterized by several recurring themes dominated by a strong influence of distributive politics. A second major theme involves the dominance of major water users who have maximized their influence through a process of cooperation and coalition building among themselves and a network of cooperation with agencies and representation within the state legislature.

In brief, Arizona ground-water policy has shifted from the classic distributive policy mode resulting from case law and a reluctant legislative process to a redistributive policy by virtue of recent comprehensive and deliberate legislation.

FORCES AND CONSEQUENCES OF CHANGE

A theoretical framework identifying the most important variables and describing political relationships involved in policy development is useful at the outset. Two such frameworks useful in analyzing the forces and subsequent consequences of recent Arizona ground-water policy reform are proposed by Lowi, and Salisbury and Heinz. Lowi's (1964) diagrammatic typology of political relationships and arenas suggests a descriptive model and provides a distinction among different types of policy and their characteristic elements without suggesting any sequence of policy evolution. In turn, the framework proposed by Salisbury and Heinz (1970) suggests a prescriptive model and develops a sequence of policy evolution based on the interaction of key political variables.

Elements from the two frameworks can be adapted and then employed conjunctively to define and analyze the forces driving the recent ground-water policy reform in Arizona. Although this conjunctive framework is useful, it should be noted that a case study of Arizona ground-water policy does not in all instances fit neatly and precisely into these frameworks.

In the Lowi paradigm, policies tend to be classified in terms of their general characteristics within one of the following three fundamental policy arenas: distributive, redistributive, and regulative (Mann, 1975). The distributive arena characterized by diffuse costs and widely distributed benefits exhibits political relationships which approximate mutual non-interference and accommodation. Distributive policies are best understood as cooperation and consensus rather than conflict and compromise (Lowi, 1964). In Arizona's experience with recent ground-water reform these disaggregated decisions were initially made in the private sector based on the market economy. Indeed, Arizona ground-water policy prior to the 1980 reform legislation approximated the classic case of distributive politics.

According to Lowi, redistributive policies cut across broad classes of interests and result in a high level of conflict in the reallocation of benefits. A controversial and far reaching 1976 court decision precipitated the attempt to redistribute ground-water resources. A Groundwater Management Study Commission was created to reallocate this diminishing resource. Therefore, the redistributive arena brought together "water elites" to formulate a redistributive policy.

The regulative arena suggested by Lowi also seems applicable to reform of Arizona ground-water policy. This policy arena is characterized by conflict and confrontation among interest groups in an unstable environment as the balance of power shifts. A regulatory policy is distinguished from a distributive type in that in the short run the regulatory decision involves a direct choice as to who will be indulged and who deprived (Lowi, 1964). In the Arizona case, the regulatory policy promoted by the Groundwater Management Act deprived agriculture of its stranglehold on this resource and indulged the other primary state water interests. The ground-water policy ultimately formulated tended to be the residue of the interplay of group conflict (Lowi, 1964).

Salisbury and Heinz (1970) propose a theoretical framework useful in predicting a sequence of evolution through the fundamental policy types described by Lowi. This framework is based on the interaction of key variables consisting of the decision process and decision costs arranged in a matrix with the demand pattern variable in relation to their relative degree of fragmentation-integration. Adaptation of this framework to a case study of Arizona ground-water policy reform has utility in analyzing the evolution of such policy. Policy types resulting from the application of this framework to both the decision process and associated decision costs relative to the demand pattern variable are characterized by Salisbury and Heinz in a four component matrix as distributive, self-regulative, redistributive and regulative. This matrix and the interaction of relevant variables is depicted in figures 1 and 2 at the end of the paper.

In an application of this analytical framework, Salisbury and Heinz hypothesize that if decision costs to policy makers exceed a certain level, structural decisions establishing guidelines and structures of authority to allocate policy consequences are preferred to allocative decisions which confer policy consequences directly. Accordingly, where the costs of allocative decisions are high, state legislatures are likely to make structural decisions; that is, they are inclined to delegate decision-making responsibilities to the interest groups involved or to defer to some other decision-making process such as the courts (Ingram, 1979B).

In the case of previous initiatives for Arizona ground-water reform, decision costs consisting of both information and negotiation costs were relatively high resulting in a preference for structural decisions. These decisions in turn resulted in either legislative or administrative delegation of responsibility to three special study commissions or a preference to defer resolution of ground-water conflicts to the courts for an allocative decision. It becomes apparent that any legislature would have great difficulty with such delicate issues as ground-water reform had they attempted to initiate and develop legislation themselves. Therefore, in the case of Arizona the structural decision to delegate responsibility and ratify allocative policy proposals was a great deal less costly to achieve. Ingram et. al. (1979B) also conclude that if interest groups negotiate agreement, as in the case of the 1980 Arizona ground-water reform legislation, the risks of offending important interests are lessened and legislators are willing to ratify decisions made outside the legislature. In some instances, as was the case of legislative initiatives for Arizona ground-water reform preceding the 1980 legislation, the demand pattern can become so intense and diffuse that the decision-making body throws up its hands in despair enacting only symbolic legislation.

In addition to structural decisions, the preceding framework also predicts that regulatory policy will ultimately result when demand is fragmented or diffuse and the costs of making allocative policy decisions are too high (Salisbury and Heinz, 1970). Applying two variations of this framework involving the demand pattern variable relative to the decision process and decision costs, the regulative policy resulting in Arizona ground-water reform can be explained and is achieved indirectly as the demand pattern and associated decision process undergo a transition from a fragmented to an integrated character. Initially, the diverse ground-water interests were in a fragmented demand pattern and likewise the decision process was itself fragmented, both with overriding high decision costs. As both the demand pattern and decision process moved from the distributive portion of the matrix toward integration through activities of the Groundwater Management Study Commission, the result was redistributive policy represented by the compromise proposal for legislative reform. Once legislative reform was ratified by the Legislature and particularly as the resulting 1980 Ground-water Management Act is implemented the decision process was and could become more institutionalized resulting in regulatory policy as prescribed by intent of the 1980 Act. Therefore, through combined political and administrative forces the policy type has shifted from distributive policy through an interim redistributive policy and possibly to regulative policy as implementation is realized.

In the analysis of policy formulation, Mann (1975) suggests that in the important policy arena of water politics there are characteristic patterns of interaction among distributive, regulative and in some instances even redistributive policy. That is, policy arenas frequently have a tendency to be diffused among one another. Further, policy may not be hammered out in either a distributive or a regulatory mode, but in the interaction between these modes. According to Mann (1975), policy making often does not reflect one pure-type of policy but rather reflects the very complexity of the policy itself. In fact, the evidence with regard to water policy suggests that the distributive mode tends to persist as a residual throughout the process of evolution. Such a notion of mixed-policy types could be applied to recent development of Arizona ground-water policy.

In short, the sequential transition of policy types from distributive to redistributive to regulatory is at best problematic. In the case of Arizona ground-water reform, it is this latter policy evolution, from redistributive to regulatory, which is tentative. This is likely since the impacts caused by state regulation of ground-water use will not come about for some time but will occur gradually. This disruption of the policy sequence as the primary interests attempt to change the policy to accommodate their respective ground-water use patterns is then possible. Thus, the actual evolution may not be dramatic and the ultimate impact of the regulatory policy could be minimal.

HISTORIAL OVERVIEW

A historical account of the development of ground-water policy in Arizona provides a useful perspective from which to examine the principal forces of change driving the evolution of such policy. Political conflict among and within diverse interest groups

is interspersed throughout this exotic history. Changing social attitudes and political challenges continued to alter the existing institutional framework of the water policy-making process in Arizona ultimately shifting the process from a judicial arena to the legislative arena.

Due to legislative reluctance, development of much of Arizona's previous ground-water law has been left to the courts. As a result, many early judicial decisions demonstrated the inability of courts to deal with the complex issue of ground-water conflicts with which they had little technical expertise or scientific information. This body of case law frequently did not recognize the physical realities of ground-water use and was not sufficiently flexible to meet the changing needs and priorities (Final Report, 1980). Consequently, the judicial arena has proven inadequate to resolve the complex ground-water conflicts in Arizona.

Serious efforts at ground-water legislation began in Arizona during the 1930's as increased development created concern about adequacy of the state's ground-water supplies. In 1937 an ad hoc study committee appointed by the governor agreed that some change was desirable but could not concur on any proposed legislation. In 1945 two bills to regulate the use of ground water were introduced with the support of the governor. During the spring of 1945, following the legislative session, proponents of ground-water reform gained an unexpected ally (Dumbar, 1977). The U.S. Bureau of Reclamation noted that it would not support approval of a proposed Central Arizona Project (CAP) unless and until the state took steps to restrict agricultural consumption of ground water. That is, it was the CAP proposal that finally tilted the scales in favor of legislative action in the mid 1940's (Mann, 1960). Immediate result of this federal pressure was passage of the Groundwater Act of 1945, Arizona's first ground-water legislation which provided for information on existing wells and acquisition of ground-water data, but no effective management program.

Between 1945 and 1948 in the midst of an economic boom and prolonged drought placing increased demands on the ground-water supplies, several attempts were made to draft and enact a more restrictive ground-water code. Unable to obtain passage of a code in the 1947 legislative session, the governor called the Legislature into special session three successive times before a more elaborate code was enacted. The final special session in which three bills were introduced was successful with enactment of the Groundwater Code of 1948 which provided for the designation of critical ground-water areas to restrict new agricultural development in areas of severe over-draft. Obviously, this legislative action was more in desperation than true conviction to serious ground-water management, yet it remained as Arizona's basic ground-water law, relatively unchanged for thirty-two years, until the more recent 1980 legislation was enacted.

Soon after passage of the 1948 Code another legal challenge was made on the theory of private ownership of percolating ground water in the original case of *Bristor vs. Cheatam*, 1952 (referred to as *Bristor I*). Also late in 1951, the Secretary of Interior again rather pointedly raised the issue that Arizona needed a more effective ground-water code.

Meanwhile, the Arizona Supreme Court was wrestling with what proved to be a far reaching and controversial ground-water issue in *Bristor I*. Before the Court reached a decision, the governor had established the second study committee to reinforce the 1948 Groundwater Code. While this commission was still struggling with the principals of public ownership of percolating ground water, the Supreme Court reached a narrowly split decision in *Bristor I* declaring ground water to be public property subject to appropriation, supporting the apparent direction of the Commission's recommendations (Johnson, 1977). Advocates of strong ground-water code took heart from this decision and felt this cleared the way for positive action in the 1952 legislative session (Mann, 1960). Under tremendous political pressure, the Court granted a re-hearing formally announcing that it would re-consider the original *Bristor I* decision and in essence indicating an impending reversal of that decision. Such action culminated in *Bristor II* restoring the notion of private property and the doctrine of reasonable use.

In response to the *Bristor I* decision and the pending legislative reform, opponents had projected irreversible harm to Arizona agriculture and economic doom. In fact, threats and prophecy of economic doom have historically been the hallmark of Arizona ground-water law (Goodman, 1978). It would have been a break with tradition to ignore these threats and prophecies. Effectiveness of the opposition in bringing about the reversal of *Bristor I* and thwarting the pending reform legislation is evidence that their political positions had been long entrenched. For years, agricultural interests have held an apparent hammerlock on Arizona ground-water policy and have steadfastly resisted even the most moderate change. Legislative history of the state since 1912 indicated an inadequacy to break the power of this economic interest group.

Until the most recent legislative activity, interest in ground-water legislation in Arizona virtually ceased in 1954. During the intervening period of twenty-six years prior to enactment of the 1980 ground-water code, the state courts again stepped into the breach with additional decisions which further weakened the 1948 Groundwater Code. In the meantime, when Arizona found itself involved in a U.S. Supreme Court suit to prove its right to divert Colorado River water and the Central Arizona Project (CAP) issue was shelved until 1963, the driving force for ground-water law reform was lost (News Bulletin, 1980). When the court battle over allocation of Colorado River water was decided in Arizona vs. California (1963), the CAP proposal was resurrected in Congress and the issue of ground-water regulation was also revived.

Then in 1976 the Arizona Supreme Court handed down the Farmers Investment Company vs. Bettwy decision (FICO), a highly controversial case which severely restricted the transportation of ground water from an existing critical ground-water area by municipal and industrial users in favor of an agricultural use. The resulting impact was clear producing an imminent and serious threat to the City of Tucson's water supply and ground-water use by five area mines. This decision created a new atmosphere of crisis among ground-water users throughout Arizona. In fact, the FICO decision sent enough shock waves through the economic and political leadership of the state to bring about comprehensive re-examination of Arizona's archaic ground-water laws (Pontius, 1980). Responding to this impending crisis, in 1977 the Legislature amended the 1948 Critical Groundwater Area Code to permit, or more accurately legitimize due to the FICO decision, the selective transportation of ground water as an interim solution.

This legislative action, referred to as the Groundwater Management Act of 1977, also established a specially structured Groundwater Management Study Commission to prepare comprehensive legislative recommendations. This, the third such study commission in Arizona's history, had a unique composition and mandate involving more authority and political clout than any of the previous commissions by virtue of including a combination of legislators and representatives of the major water-using interests. The membership of this commission recognized the historic political nature of Arizona ground-water problems in an obvious attempt to assure ultimate acceptance of the recommendations by the Arizona Legislature.

This newly established Groundwater Management Study Commission met initially in November 1977, to begin its arduous task of developing a comprehensive ground-water management code. Following intensive debate, a strong coalition developed between urban and industrial interests commanding a majority of the members. The Commission then completed its draft recommendations in June 1979 with the agricultural interests dissenting and issuing their own minority report. Significantly, for the first time in Arizona's history urban, mining, and other industrial interests had been able to impose their will in the proposed draft of a new ground-water law.

After a series of state-wide hearings to receive public comment, the original legislative proposal was judged to be too damaging to agricultural interests thus dooming its chance of enactment as law. Using the draft recommendations as a framework for intelligent debate, further negotiations among agricultural, municipal and mining interests continued within the Commission membership resulting in tentative agreement in a working document referred to as "Concepts for Agreement". This document provided for centralized state management, allowed increased sales of ground-water rights, eliminated the option of pro rate reduction and set forth a more specific management program (Final Report, 1980).

In November 1979, when further progress at compromise broke down, Governor Bruce Babbitt intervened. At this point in a repeat of history, Interior Secretary Andrus again used the CAP as federal leverage to expedite ground-water reform. Through the Governor's persistent, skillful and dedicated leadership in a six-month series of private, informal negotiating sessions by a seven member self-appointed delegation representing the three principal interests of the Commission, referred to as the "Rump Group", a successful but delicate compromise of substantive issues was negotiated. Legislation was drafted by the Commission staff, introduced in a special legislative session convened by the Governor and passed with limited debate. This legislative action took place in a record seven hours on June 11, 1980. The 1980 Groundwater Management Act was signed into law by a victorious Governor Babbitt on June 12, 1980.

After nearly half a century of political conflict, judicial decision and legislative inaction, Arizona had enacted a ground-water code, heralded as the most progressive in the Western states, with which to initiate "after the fact" management of the state's dwindling ground-water supplies.

IMPLICATIONS AND IMPLEMENTATION

Future implications of the 1980 Arizona Groundwater Management Act are potentially tremendous but remain untested as implementation proceeds. This legislation, which repeals and otherwise supplants all previous legislation in Arizona, provides for the designation of ground-water basins as active management areas (AMA's). Ground-water withdrawals within designated AMA's will be managed pursuant to the statutorily prescribed goal of safe yield through implementation of management programs developed by a highly centralized and authoritative state Department of Water Resources with broad powers over water management and policy issues. Mandatory conservation by all ground-water users provides the cornerstone for achieving management goals. Other principal methods of management include permanent retirement of irrigated lands, imposition of a pump tax on all ground-water withdrawals, prohibition of development of subdivided property without an assured water supply and augmentation programs to balance supply and uses in ground-water basins.

The Act establishes several classes of grandfathered rights protecting extant ground-water uses within active management areas and permits the market of such rights when relinquished to other uses. In addition to grandfathered rights, the legislation provides for six types of special permits for establishing new ground-water uses which are otherwise prohibited. Thus, the Act is clearly premised on the exercise of the police power to regulate the withdrawal and use of ground water.

If interpreted literally the intent of the 1980 Groundwater Management Act is clearly regulatory. In the declaration of policy, the Act states in part that, "... it is necessary to conserve, protect, and allocate the use of groundwater resources of the state and to provide a framework for the comprehensive management and regulation of the withdrawal, transfer, use, conservation and conveyance of rights to use the groundwater in this state." (Arizona Revised Statutes Annotated, Section 45-401). Still, the intent of the Code and its effective implementation are hampered by a number of potential obstacles. For the state of Arizona to move from ground-water policy of previous nonmanagement to one of strict regulation and ultimately mandatory conservation presents intriguing problems of political and economic feasibility.

To regulate the allocation and use of ground water, the Act created a powerful director and a centralized state agency, the Department of Water Resources. Investing a new director and Department of Water Resources (DWR) with significant power has presented an array of potential political problems. The governor's power to appoint key personnel such as the director and local Active Management Area (AMA) Advisory Council members makes these selections both politically and economically sensitive.

Related to the sensitive nature of the director's selection is the vast discretionary authority vested in him by way of enforcing the Code. This authority enables the director to determine the maximum water duties used by agriculture in AMA's, set permissible conservation goals for cities and industry, approve management plans to conserve and reduce withdrawals in critically overdrafted areas, and file for civil and criminal penalties for violations of regulations. The lack of specific goals for the reduction of ground-water overdrafts, the ability to designate AMA's where ground-water overdrafts require it, the issuance of permits to drill wells, and approve land developers' water supplies all contribute to a powerful director's role. This discretionary power was not the original intent of the Study Commission members. It emerged as a result of the Commission's attempts to avoid dealing with certain fundamental differences between the competitive agriculture, mining, and urban interests for which there was little hope of resolution.

Another institutional problem which could hinder implementation is one of local application and enforcement of the Code. The centralization of power at the state level and a relatively weak local agency portends of an institutional gap. AMA directors, with the recommendations of an Advisory Council, are responsible for implementation of the Code within their managed areas, but may lack sufficient authority or coercive capability to ensure local compliance. An operational agency existing between the state and local level or the extension of greater authority to the local AMA director appears necessary for effective implementation.

A final institutional impediment to effective implementation is the need for adequately funding the DWR. The Code is only as effective as its implementation and the department which administers it. Departmental staffing appears to be crucial to fill gaps in the Act through extensive administrative effort. Should the state legislature become niggardly in its appropriations for staffing and operations of the DWR the Code's regulatory impact may be minimal in reducing ground-water overdrafts.

Beyond the limited desire to make sound public policy for the allocation of a threatened and diminishing resource there are few economic incentives to comply with

the Code. Statewide agriculture currently uses 89% of the ground water. To finance implementation of the Code, a pump tax will be imposed on all ground water withdrawn. Thus, agricultural use of ground water will be the primary source of funding for the DWR in addition to its legislative appropriations. There are limits on the amount of the pump tax, but it is ironic that agriculture will at least in part pay for its own demise as the director begins using those revenues to purchase agricultural land to retire its ground-water rights to achieve the safe yield goal.

The Code is data intensive with high information costs. Details of record keeping could become a constraint to implementation. The director's power to determine water duties for irrigated agriculture, will depend on accurate information from irrigators. Such record keeping and determination of water duties is an enormous task which will add a significant amount to the administrative costs of implementation.

The success of the ground-water code is ultimately dependent on the principal ground-water users who formulated it. The compliance of agriculture, the mines, and cities revolves around their perceptions of economic and political feasibility and, more importantly, the compliance of their competitors for this limited ground-water supply. Each interest sees problems in the Code which they hope to rectify through legislative amendments. Such problems and jealousies could further erode the DWR's ability to implement the Code.

As mentioned earlier, several contentious problems were not addressed or resolved by the Commission. The Commission failed to address such issues as water quality, Indian rights to ground water, other questions of federal versus state jurisdictions over ground-water rights attached to federal lands, and conjunctive use.

As suggested the intent of the Code is to regulate and conserve ground-water resources. Implementation is a cumulative, sequential management process over forty-five years achieving the safe yield goal in 2025. Initial requirements beyond well registration and water-use reporting are minimal, allowing sufficient time for agriculture to comply. The conservation requirements become more stringent over time, however, so that the real tests of support for and compliance with the Code will not come until at least 1990 and more importantly, 2006, when the director may begin purchasing and retiring agricultural lands to obtain ground-water rights. While there seems to be ample time to reduce ground-water use there is also time to amend the Code or challenge its constitutionality as the political and economic winds shift in favor of the vote-laden urban areas and high employment mining industry.

Although the 1980 Act is a product of the process of agreement and has met the initial test of political compromise, a great potential for constitutional challenges and extensive amendment remains. The regulatory policy promoted by the Groundwater Management Code is, therefore, subject to significant implementation problems. The predicted policy sequence in the next phase involving redistribution of ground-water supplies from agriculture to the municipal and industrial interests to one of stringent regulation is, at best, uncertain and problematic. The policy shift will likely not be dramatic occurring gradually over forty-five years. Potential difficulties with implementation may disrupt an effective transition from the predicted redistributive to regulative policy sequence. Thus, the ultimate destiny of this fragile legislative compromise remains to be seen.

The 1980 Groundwater Management Act has vast implications in Arizona, because it will likely dictate the state's economic mix, growth patterns and demographics for the foreseeable future. The success or failure of this historic legislation will depend on implementation of the complex management process it prescribes and the inevitable legal challenges over the next several decades.

CONCLUSIONS

Based upon Arizona's tumultuous history of ground-water policy it is indeed remarkable that a law which so revolutionizes the management of ground water in Arizona was enacted. Out of political and economic necessity, this legislation is the product of a delicate compromise negotiated among competing ground-water users achieved through the process of agreement.

Political forces of change have shifted Arizona ground-water policy from the classic distributive policy to redistributive policy. The predicted shift from the redistributive mode to regulatory policy is tentative, replete with potential problems of implementation and subject to disruption as the implementation process proceeds. The forces driving this phased policy sequence are characterized by repeated federal threats affecting a major reclamation project and special interest group pressures combined with the physical realities of ground-water overdrafts.

If change is to come to distributive water politics, it will not come from the public and their elected state representatives, since there appears to be minimal political incentive for legislators to initiate action on water issues (Ingram, 1979A). As an example, the recent initiative producing extensive ground-water reform in Arizona came from a strong coalition of major interests, dedicated leadership of the governor and federal coercion. After the primary decision costs had been incurred, the initiative was then ratified by the Legislature in subsequent legislation absent the tremendous political costs otherwise inevitable to the legislative process.

In the broader context of water resources planning, the Arizona experience suggests a changing role for the planning process at all levels of government. Meanwhile, recent Arizona ground-water reform has introduced a new management tool to the statewide planning process which moves far beyond other states with similar ground-water overdrafts.

REFERENCES CITED

- Arizona Groundwater Management Study Commission. 1980. Final Report.
- Arizona Revised Statutes Annotated. 1980. Title 45, Sections 105-637.
- Arizona Water Resources News Bulletin No. 80-2. April-June 1980.
- Chalmers, John R. 1974. Southwestern Groundwater Law: A Textual and Bibliographic Interpretation, Arid Lands Resource Information Paper No. 4, University of Arizona, Office of Arid Lands Studies.
- Cortner, Hanna J. and Mary P. Berry. 1977. Arizona Water Agenda: Changing Decision Agendas and Political Styles, Hydrology and Water Resources in Arizona and the Southwest, Vol. 7: 7-14.
- Dunbar, Robert G. 1977. The Arizona Groundwater Controversy at Mid-Century, Arizona and the West, Vol. XIX, No. 1: 5-24.
- Goodman, Mark N. 1978. Current Groundwater Law in Arizona, Arizona State Law Journal, 2-3: 205-224.
- Ingram, Helen, Nancy Laney, and John R. McCain. 1979A. Managing a Limited Resource: The Political Constraints on Water Policy in the Four Corner States, Utah Law Review, No. 4: 719-745.
- Ingram, Helen, Nancy Laney, and John R. McCain. 1979B. Water Scarcity and Politics of Plenty in the Four Corner States, Western Political Quarterly, Vol. XXXII: No. 3: 298-306.
- Johnson, James W. 1980. The 1980 Arizona Groundwater Management Act and Trends in Western States Groundwater Administration and Management. 26th Annual Rocky Mountain Mineral Law Institute Proceedings.
- Johnson, Rich. 1977. The Central Arizona Project 1918-1968, University of Arizona Press.
- Lowi, Theodore J. 1964. American Business, Public Policy, Case-Studies and Political Theory, World Politics, Vol. XVI: No. 4: 677-715.
- Mann, Dean E. 1960. Law and Politics of Groundwater in Arizona, Arizona Law Review, Vol. 2, 241-267.
- Mann, Dean E. 1975. Political Incentives in U.S. Water Policy: Relationships Between Distributive and Regulatory Politics, What Government Does (edited by Matthew Holden and Dennis Dresang), 94-123.
- Pontius, Dale E. 1980. Groundwater Management: A New Set of Rules, Arizona Bar Journal 16: 28-52.
- Salisbury, Robert and John Heinz. 1970. A Theory of Policy Analysis and Some Preliminary Applications, Policy Analysis in Political Science (edited by Ira Sharkansky), Markham Publishing Co., 39-60.
- Thomas, Robert D. 1972. Federal-Local Cooperation and its Consequences for State Level Participation: Water Resources in Arizona, Publius Vol. 1: 77-94.

FIGURES

Figure 1. Interaction of demand pattern and decision process variables.

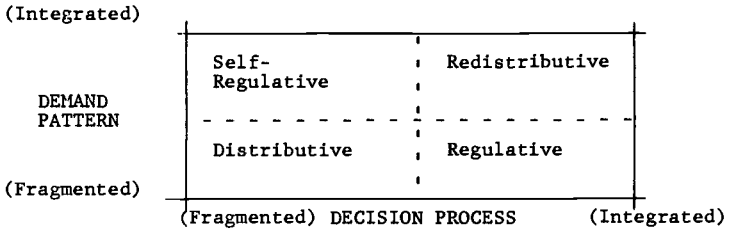
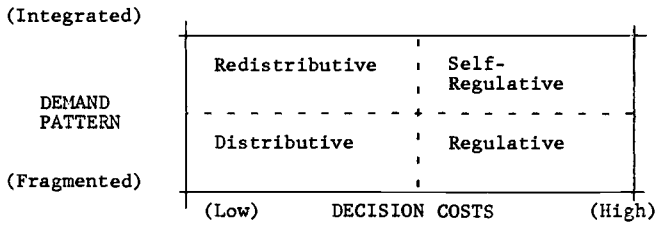


Figure 2. Interaction of demand pattern and decision costs variables.



Adapted from: Salisbury and Heinz (1970).